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EDITORIAL.

Malayan Fruit Canning.

Articles have been published in the last two numbers of this Journal on various aspects of the Malayan pineapple canning industry. In the March number a brief account was given of the local cultivation of this crop and of factory methods employed. The April number included an article on the trade in canned fruits in the United Kingdom which shewed the very important share which the Malayan product has in this market. In the present issue we present an article which recounts the methods employed in fruit canning in the United Kingdom. Two further articles are to appear in subsequent numbers dealing respectively with the organisation and control of fruit canning in the United Kingdom and the present position of the Malayan pineapple canning industry.

The articles combined will then shew and contrast the methods employed in this country and in the country to which the bulk of our produce is consigned and will demonstrate the lines along which the Malayan canned pineapple industry should develop in order to maintain its present markets and establish new connexions in the face of growing competition.

The author of the articles on the United Kingdom conditions has had the benefit of much valuable assistance from numerous officials and unofficials in England who have not only placed information at his disposal, but have given him the benefit of reading the articles and making a number of useful criticisms and emendations.

In the course of his personal enquiries in the United Kingdom the author was offered many views and criticisms concerning Malayan canned pineapples. Some of these are discussed in these articles, others have been noted for reference to the trade in this country.

In most countries in which fruit canning is practised, canners do not confine themselves to one description of fruit, but handle various kinds at different seasons. The question naturally arises whether there are other fruits which are grown or are capable of being grown in Malaya which are suitable for canning and might command a market. The fruit that stands out in this respect is the China (Mandarin) orange which grows and bears fairly well in

Malaya. This fruit is being extensively canned and exported from Japan at the present time and there does not seem to be any obvious reason why the canning of it should not be developed in Malaya.

Grape fruit also does fairly well in Malaya, and although there may be some doubt as to the possibility of developing a trade in fresh fruit, there should be possibilities of establishing an export trade in canned grape fruit, the popularity of which is steadily increasing.

A fruit which may possess possibilities in this direction is the papaya (papaw). So far no attempts have been made to can it and it is possible that it might disintegrate during the cooking process. On the other hand, it is a very usual and acceptable ingredient of fruit salad in the tropics and, if it could be satisfactorily canned and exported, might find a ready market.

Experimental work on the canning of other tropical fruits might also be worth undertaking, especially in view of the gluts which occur at certain seasons.

The appointment of a research chemist for the Malayan canning industry which has been approved by the Governments concerned should prove of great value to the pineapple canning trade. His services should also be useful in connexion with investigations on the possibility of utilizing other Malayan fruits in the canning industry.

Control of Copra Beetles.

Information was sought in 1932 by a company in Singapore regarding beetles infesting their copra stores from whence they spread to private houses in the vicinity, thereby causing great annoyance.

Recommendations were made, and it was pointed out that damp and mouldy copra is particularly conducive to the breeding of certain insects, and that copra from old nuts is less liable to attack than that from young and insufficiently dried nuts.

In November 1933, the President, Municipal Commissioners, Penang, sought assistance regarding the problem of "copra bugs" in Penang, stating that, owing to the slump in the copra market, a very large stock of copra had accumulated and the business area of the town was infested with these insects.

Considerable work has been done by this Department on insects associated with copra, and the results will probably be published during this year, but in so far that attention has comparatively recently been drawn to the nuisance occasioned by *Necrobia* (the copra beetle), an article on this subject is published in this place.

The author concludes that traps and fumigation to rid copra stores of the copra beetle are only a palliative and not recommended except under exceptional circumstances, but that the production of copra of good quality would obviate trouble from this source.

Original Articles.

THE CANNING OF FRUIT IN THE UNITED KINGDOM

BY

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The British fruit canning industry has an annual output of about 700,000 cwts. of canned fruit. There are seventy-four factories canning fruit in England and Wales, five or six in Scotland and one in Northern Ireland. The English factories occur throughout the country, but tend to be grouped in the principal fruit-growing districts.

The fruit treated consists mainly of soft fruits and plums, the only hard fruit canned being apples. As the different kinds of fruits succeed one another in order of ripening most factories handle a considerable succession of fruits in one season. Many of the factories combine the canning of vegetables with that of fruit, thus serving to extend the working period.

Factories vary considerably in size and in equipment; the tendency is towards steady improvement in the latter respect, the work of the Ministry of Agriculture in connexion with the National Mark scheme and that of the Fruit and Vegetable Preservation Research Station at Campden having played an important part in this.

The lay-out and design of canning factories is of great importance as on them depends the ability to control the various operations and ensure proper economy in working.

The standard lay-out is in lines running through the factories along which the fruit progresses through the various operations until the finished product emerges at the end. Typical canning factories are long buildings, usually built of brick or galvanised iron with overhead lights. Produce is delivered at one end, proceeds through the factory during the course of manufacture, the finished article being delivered to store at the other; stores are situated usually at one end of the factory or at the side so as to facilitate storage and delivery to railway or delivery vans.

Fruit for canning is grown under a definite contract drawn up between the grower and the canner, or it is purchased at an agreed price during, or just previous to, the canning season. In either case the canner stipulates that the fruit must be of the requisite variety and quality for canning, and when contracts are made it is customary to arrange for an arbitrator who can be called upon in the event of a dispute. Deliveries are made in chip baskets, trays or crates, the type of container depending on the nature of the fruit, and transport is generally by motor lorries, although rail transport is sometimes used. On arrival at the cannery each consignment is weighed and inspected to ensure that the variety is correct and the quality up to standard.

In the case of apples the fruit is peeled, cored and quartered by machinery, although in some cases parts of the operations are performed by hand. The peeling machine in its various forms is a simple but ingenious form of mechanism; it is, however, probably not sufficiently robust to be capable of being applied to pineapples. In Hawaii a sizing, peeling and coring machine is used for pineapples, but it seems open to doubt whether it could, under Malayan conditions, compete with hand peeling. Hand peeling seems to be little open to objection provided it is carried out under satisfactory conditions. In America, the peeling of pears for canning is stated to be largely performed by hand.

Soft fruits and plums are carefully sorted, and any damaged or blemished fruits are removed. A preliminary preparation is also carried out where necessary; strawberries and plums are graded, generally followed by a thorough washing in running water.

The fruit is then conveyed to the packing tables, endless belt conveyors being usually employed for the purpose. During its transit the fruit is subjected to further inspection to ensure that all material going to each particular line conforms to the grade that is there being packed, the operators picking out all unsuitable pieces.

On arrival at the packing table the fruit is packed into cans which are conveyed to the packers by some form of automatic conveyor, very often of the endless band or endless rope or chain type; packers either remove the cans from the conveyors by hand or they may be fed down automatically by some form of gravity conveyor with a control stop. After filling, the cans are placed by the operators on another conveyor and then proceed on their journey to the various stages of the processing operation. It is noteworthy that after they have left the hands of the fillers the cans and their contents are not touched by hand again until the product is ready for the store.

The processing plant consists of syruping machines which automatically deliver the correct amount of syrup to the cans, exhausters which heat the cans by steam to a temperature of about 80°C. to exhaust the air, automatic seamers which place the lids on the cans and seal them, cookers in which the sealed cans are cooked, coolers in which they are subsequently cooled to a temperature of about 35°C. and labellers in which the labels are applied to the finished cans.

The exhausting process takes from five to ten minutes and the cooking about five to twenty-five minutes, the length of the operation varying according to the size of the cans handled and the nature of the fruit.

The operations of processing are controlled in some cases by means of temperature tests, sample cans being regularly tested by means of thermometers. The extension of this practice in British canneries is a fairly recent introduction. In the most efficient and up-to-date canneries a laboratory is provided, and a staff of chemists supervise and control the operations in the various stages.

Sugar is dissolved in water in glass, enamel-lined, or stainless steel tanks to give the requisite density of syrup required. The tanks are usually fitted with a steam heated coil to get the sugar quickly into solution and the syrup is clarified by passing it through thick flannel, muslin or fine wire gauze before it is used to fill the cans. It is applied to the fruit at a temperature of about 76°C.

Cans are seldom made in the canning factory; most canners purchase their supplies from one of the can-making companies; of these by far the largest is The Metal Box Company, Limited, which supplies about 80 per cent. of the cans used in Great Britain. This company operates two can-making factories in England, and both are equipped with a number of can-making lines of machinery, each of which turns out complete cans at the rate of three hundred per minute.

The empty cans are transported to small canneries in returnable cardboard containers holding about one to two hundred cans. Bulk supplies for the larger factories are packed in railway trucks, and when the latter reach their destination the cans are transported automatically direct from the truck to the empty can store. Thus there is no work in the cannery connected with the cans apart from the fixing of the lids on the filled cans, and this is carried out by means of semi-automatic or fully automatic can-closing machines. These are supplied to the canners by the can-makers, who maintain a trained staff to help the canner to keep the machines in thorough working order.

Operatives in canneries are mainly girls who perform all operations concerned with the handling of the fruit and its packing. They are required to wear overalls and caps.

Disposal of Waste in Canning Factories.

In pineapple canneries in Malaya the disposal of waste material is a problem of some importance. In English and other canning factories waste material is utilised so far as possible for the manufacture of by-products; among these are included fruit pulp, pectin, jam and similar preserves, and fruit juices. In this way practically all the waste material is employed, special machinery being installed to deal with it. In Hawaii, pineapples are canned in a mixture of syrup and pineapple juice; waste fruit material is made into pulp and jam, the peel being converted into pineapple bran and used as a feeding stuff.

With the marginal profits which the Malayan industry has to face at present, the possibilities of additional profits, which the utilisation of by-products may bring, should not be neglected, and attention to this aspect of the industry is an obvious requirement.

Canned Fruit Salad.

Formerly canned fruit salad was exclusively an imported article in Great Britain but now it is being manufactured on an increasing scale in England and its popularity is steadily growing.

In preparing it the various canned fruits utilised are purchased by the manufacturer in separate containers, which are opened in the factory, and salad compounded in accordance with the formula employed, the product being repacked in fresh tins which are re-processed and labelled.

In all fruit salad formulae pineapple is an essential ingredient and comprises about ten per cent. of the total contents. Formerly Hawaiian pineapple was exclusively employed but latterly the trade has taken to using Malayan pineapple on account of its lower price and of its being admitted to the United Kingdom without payment of duty. The packers' requirement in this respect is high quality golden yellow slices packed in special sized containers; at times packers experience difficulty in obtaining material that is entirely reliable which meets their needs in all respects and it would seem that opportunity may here exist for canalising trade between the canners in Malaya and the factory consumers with advantage to both.

Research in Relation to the Canning Industry in Great Britain.

An important feature of the British canning industry is the part played by the Fruit and Vegetable Preservation Research Station at Campden in Gloucestershire. The premises were purchased by the Government towards the end of the War for the production of jam and dried vegetables for the troops, and in 1921 they were transferred to the University of Bristol for investigational work on the preservation of horticultural produce. Actual research work, however, only commenced in 1923 when two research workers were appointed.

The Institution occupies large and convenient premises, and at present possesses a staff of six scientific workers. Separate laboratories are equipped for the study of chemical, bio-chemical, physical and bacteriological problems in connection with canning. There are also experimental canning rooms fitted with the necessary machinery for the canning of fruits, vegetables and other products, and a room for the examination of National Mark samples.

The cost of maintaining the Station is about £4,800 a year, of which about two-thirds are contributed in the form of a block Grant from the Ministry of Agriculture and Fisheries, the remainder being made up by subscriptions from various canning undertakings throughout the country.

The Station is attached to the University of Bristol for administrative purposes, and is controlled by a Management Committee comprising representatives of the Ministry of Agriculture, the University of Bristol, and the canning industry and allied trades. Close contact with the industry is main-

tained through a Technical Advisory Committee, which comprises the majority of the qualified technical men engaged in the canning of fruits and vegetables in England.

The work of the Station comprises educational, advisory and research work, and the examination of samples under the National Mark scheme. In 1933 over 1,000 enquiries were attended to, and 550 persons visited the Station, while 48 visits of inspection were made to factories by officers of the staff. Under the National Mark scheme 2,400 samples were examined. In addition, short courses of instruction on the principles of canning were given to members of the staffs of canning firms, and a number of lectures were delivered at various centres.

The range of research problems dealt with by the Station is wide and covers a large number of points connected with the industry. The outstanding problems are concerned with horticulture, nutrition, bacteriology, physiology, chemistry, physics and metallurgy, and many of these are now being studied either at the Research Station or in close touch with other Research Institutes or technical bodies. At present the most urgent scientific problem is considered to be the discovery of the source of infection and method of eradication of a heat-resistant mould which causes serious losses in canned and bottled fruits.

Questions of heat-penetration during processing are also important and are being studied, while on the horticultural and agricultural side much work has been carried out in order to ascertain which varieties of fruits and vegetables are most suitable for canning. This question is still being investigated by the Campden Station in collaboration with Horticultural Stations and Agricultural Institutes in various parts of the country. Corrosion of cans is also being studied as well as the vitamin contents of canned foods, while many other points have been elucidated or are under study.

Technical advice based on the results of experiments and research is available to all subscribers, reports on the quality of canners' packs are given when required, and the industry looks to the Station for advice and guidance whenever problems or difficulties arise.

There is no question that the Station has played a very important part in the development of the British canning industry, and that it is now an essential factor in its maintenance.

THE ATTRACTION OF *NECROBIA RUFIPES* DE GEER. (THE COPRA BEETLE) TO THE FATTY ACIDS OF COCONUT OIL AND TO TYPES OF COPRA

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In January, 1931, a report entitled "Notes on the Copra Beetle, *Necrobia rufipes* de Geer." was received by the Department of Agriculture with a request that the method described therein be tested in Malaya. In this communication, oleic acid was stated to afford a most useful attractant to and method of control for *Necrobia* and that when about half an inch of oleic acid was placed in quart-sized containers with holes punched just about the level of the acid "so many beetles were trapped that the cartons were filled with them and the oleic acid spilled on the floor where it continued to attract large numbers of beetles". Suitable cartons at that time being unobtainable in Malaya, cigarette tins were employed. The first trial consisted in placing in a jar containing forty-eight *Necrobia* beetles, two cigarette tins with punctured lids, into one of which was poured a small quantity of oleic acid and into the other a similar quantity of water. The tins containing oleic acid and water trapped thirty-six and five beetles respectively through a period of thirty-nine days, and after that period seven beetles still remained in the common cage. In another experiment, valerianic acid* was compared with oleic acid and for this purpose sixty-three *Necrobia* beetles were introduced into a glass jar connected by rubber tubing to two flasks, one containing oleic and the other valerianic acid. On the next day, six *Necrobia* had entered the oleic and seventeen the valerianic trap, and on the following day, nine more *Necrobia* had entered the oleic and eighteen the valerianic flask. Thirteen still remained in the glass jar. The results from these two preliminary experiments were not considered as supporting the claim for oleic acid and since greater attraction might be shown under more natural conditions the next experiment was conducted in a copra store. For this purpose, oleic acid was compared with palmitic, stearic, (two other fatty acids of coconut oil), propionic, valerianic and butyric acids. In this copra store, one man could collect in glass vials about one hundred *Necrobia* beetles in ten minutes. The cigarette tins with punctured lids containing the six acids were hung on posts about five feet from the ground. The acids were changed weekly. Over a period of three weeks, thirty-seven *Necrobia* beetles were recorded in the oleic, eighteen in the valerianic, two in the propionic, six in the butyric, one in the palmitic and

* Valerianic acid was tried merely on the ground that it was available in the entomological laboratory.

none in the stearic acid traps. More *Necrobia* were trapped in the oleic than in any of the other acids, but, in view of the general presence of *Necrobia* throughout this store, its attraction to oleic acid was not considered high.

In a subsequent experiment conducted in the laboratory, 5 cc. of linoleic, valerianic, oleic and caprylic acids, 5 gr. of lauric and myristic acids, a small quantity of the mycelium of the mould *Aspergillus cinnamomeus* * and a damaged grub of *Necrobia* were contained in separate glass wells which, whilst admitting free entry, were sufficiently covered to prevent *Necrobia* beetles falling into them. On the following morning, two *Necrobia* beetles were observed in the linoleic, one in the valerianic and five in the *Aspergillus cinnamomeus* cage. The grub of *Necrobia* had been devoured, the skin only remaining. No beetles were recorded in the oleic, caprylic or myristic cages.

In another experiment, which was triplicated, squares of about one inch cut from the same piece of good quality copra were treated individually with lauric, caprylic, linoleic, myristic and oleic acids and *Aspergillus cinnamomeus*. These squares, together with a square of copra with the superficial green mould, *Penicillium glaucum*, and of degenerated moist copra, were placed in a common cage. *Necrobia* beetles were afterwards introduced and their behaviour as to the number of visits to the squares was recorded.

Degenerated and pitted copra	*A. cinnamomeus*	Copra with *P. glaucum*	Myristic	Lauric	Linoleic	Caprylic	Oleic
125	109	79	68	52	20	19	10

This result indicates that degenerated pitted copra, copra with *A. cinnamomeus*, and copra with *P. glaucum* show most attraction and that the solid acids of coconut oil, *viz.* myristic and lauric, greater attraction than its liquid acids linoleic, caprylic and oleic.

Since more *Necrobia* beetles visited the pitted, mouldy, moist degenerated copra, a piece of mouldy and somewhat degenerated copra was divided into two squares, from one of which the mould was, as far as possible, scraped. These squares were then placed in a cage with squares of copra treated individually with five of the fatty acids of coconut oil and a square of good quality copra with a slight development of *Penicillium glaucum*. The number of visits by *Necrobia* was recorded with the following result:

* One of the moulds associated with copra.

Mouldy degenerated copra	Same as (1) with mould scraped off	Myristic acid	Lauric acid	Good copra with slight development of *P. glaucum*	Oleic acid	Caprylic acid	Linoleic acid
76	68	58	32	28	9	3	4

The removal of the fungus growth would not appear to have rendered the degenerated copra much less attractive to *Necrobia* and suggests that decomposition products of degenerated copra resulting from bacterial or fungoid activity attract *Necrobia* beetles, and that they are more prevalent in degenerated than in good quality copra although supporting a slight development of *Penicillium glaucum*. It will be observed that myristic and lauric acids, as in the previous experiment, show greater attraction than the liquid acids of coconut oil.

The fatty acids, myristic, lauric, oleic, linoleic and caprylic, were afterwards individually compared in separate cages with *Aspergillus cinnamomeus* as to their attraction for *Necrobia*. For instance, as shown in the following table, in the cage containing *A. cinnamomeus* and caprylic eleven *Necrobia* visited the *A. cinnamomeus* receptacle while two *Necrobia* visited the caprylic one. The number of visits by *Necrobia* is tabulated below :—

A. cinnamomeus	Caprylic	Oleic	Linoleic	Lauric	Myristic
11	2				
8		3			
12			2		
9				12	
10					10

More visits by *Necrobia* were made to lauric and myristic than to caprylic, oleic or linoleic acids and about the same number to lauric and myristic as to *Aspergillus cinnamomeus*.

Additional Experiments on the Attraction of *Necrobia*.

The previous experiments were completed in 1932 and indicated that oleic acid was not greatly attractive to *Necrobia*. In view, however, of the fact that it had been considered eminently attractive in England and that our observations were not confirmatory, the tin receptacles were thought to be responsible for the discrepancy in the results and cartons becoming available were employed to decide this in the following tests :—

Experiment I. This experiment was in progress from April 25th to June 8th, 1934, in a shop house in which sacks containing copra were stored. The sacks which were piled on top of each other almost reached the ceiling. No sacks were removed and the door was kept locked during the course of this experiment. Twenty-four cartons, half of which contained oleic acid and half the same quantity of castor oil, were used. Six cartons with oleic acid and six with castor oil were hung from a beam about one foot above the sacks and six cartons with oleic acid and six with castor oil were placed on the floor. *Necrobia* beetles were numerous. Six counts at weekly intervals were made with the following result :—

	Oleic acid	Castor oil
Cartons on Floor	432	166
Cartons from Beam	24	18

It will be observed that the position of the cartons influenced the result since more beetles were trapped or fell into the cartons placed on the floor than into those suspended from the beam. Oleic acid appears to be more attractive than castor oil. During the six weeks, the six cartons containing oleic acid on the floor caught 432 *Necrobia* beetles, an average per week of 72, or of 12 per carton per week.

Experiment II. This experiment was commenced in the same shop house on June 8th and terminated on July 6th, 1934. A weekly count was made, and castor oil was used for comparative purposes with oleic acid. Each type of cage was duplicated. Two glass beakers containing oleic acid and two containing castor oil were also included. Some cartons were covered and others uncovered, and in those covered and in some uncovered ones holes of the diameter of a pencil were punctured. To two uncovered cartons (6), to two uncovered but holed cartons (7) and to two covered but holed cartons (5) containing oleic acid and castor oil, bacterial slime from coconut meat was added. All containers were placed on the floor about one foot apart.

The result is tabulated below :—

	Number of *Necrobia* in Oleic acid	Number of *Necrobia* in Castor oil
1. In two beakers uncovered ...	92	96
2. In two cartons uncovered ...	167	109
3. In two cartons uncovered and holed ...	162	117
4. In two cartons covered and holed ...	25	8
5. In two cartons covered and holed and with bacterial slime added ...	44	40
6. In two cartons uncovered and bacterial slime added ...	144	160
7. In two cartons uncovered and holed and bacterial slime added ...	169	117

This result shows that uncovered cartons containing oleic acid or castor oil trapped more *Necrobia* than did the glass beakers, that covered cartons with holes were less efficient than uncovered cartons, that more *Necrobia* (803) were caught in oleic acid than in castor oil (647) and that the addition of bacterial slime possibly enhanced the attractiveness of oleic acid and castor oil. (cf. 4 and 5). In the eight uncovered cartons containing oleic acid, 642 *Necrobia* were recorded during a period of four weeks; this is equivalent to 20 *Necrobia* per carton per week and, in the eight uncovered cartons containing castor oil, 503 *Necrobia* were recorded during the same period, which is equivalent to 16 *Necrobia* per carton per week. Since *Necrobia* is very active and in its wanderings may have ascended and fallen into the cartons, the number attracted to oleic acid and castor oil may have been less than the above figures indicate. In the course of these experiments, cartons containing water have been found with an occasional *Necrobia*. The great attraction of *Necrobia* to oleic acid is not corroborated and the remark by a laboratory Malay Assistant to the effect that he could hand-collect more *Necrobia* beetles in five minutes than any container trapped in a week was much to the point.

Experiment III. In view of the possibility that oleic acid by exposure to the atmosphere or by the contamination of insects suffered some deterioration, an experiment was conducted for a period of four weeks in a copra store in which *Necrobia* beetles were numerous. Weekly records were made. The result is tabulated below :—

	Number of *Necrobia* attracted to Oleic acid	Number of *Necrobia* attracted to Castor oil	Number of *Necrobia* attracted to Coconut oil
1. Unused, without exposure. In cartons uncovered and unholed ...	81	50	88
2. Unused, exposed in glass beaker for 76 days. In cartons uncovered and unholed	87	48	
3. Unused, exposed in glass beaker for 76 days. In carton uncovered but holed ...	103	60	91
4. Unused, exposed in glass beaker for 76 days. In carton covered and holed ...	25	19	35
5. Unused, exposed in glass beaker for 32 days. In glass beaker ...	35	33	
6. Unused, exposed in carton for 32 days. In carton uncovered and holed ...	82	55	
7. Used in previous traps, and filtered. In carton uncovered and unholed ...	54	30	
8. Used in previous traps and filtered. In glass beaker ...	40	29	

In considering this result, the attraction of *Necrobia* to oleic acid and coconut oil is similar but seemingly (*vide* below) greater than to castor oil. The exposure to the atmosphere of oleic acid, castor oil and coconut oil would not appear to lessen their attractiveness but after being contaminated with insects the two former, especially oleic acid, appear to decrease in their attractiveness. More *Necrobia* beetles were recorded in uncovered than in covered but holed cartons and slightly more in uncovered and holed than in uncovered cartons. Glass vessels possibly owing to their smooth surface are not so suitable as cartons.

The largest number of *Necrobia* beetles (103) was caught in the uncovered but holed oleic acid trap through a period of four weeks, an average of twenty-six per week in a copra store where this beetle was numerous. Although oleic acid undoubtedly is attractive to *Necrobia* this attraction is by no means considerable and in view of this, the use of oleic acid as a control for *Necrobia* in Malaya is not recommended.

A further experiment was conducted in which more *Necrobia* beetles were recorded in cartons containing kerosene oil than in those containing oleic acid. Accordingly, another experiment was conducted to ascertain the behaviour of *Necrobia* beetles after having fallen into an acid or an oil. For this purpose, *Necrobia* beetles were dropped into cartons containing oleic acid, kerosene, coconut and castor oils and water. Observations showed that *Necrobia* beetles dropped in kerosene oil died immediately, in oleic acid and coconut oil they died almost immediately, and if they managed to crawl out and up the side of the carton they died; in castor oil 53 per cent. succumbed almost immediately, 7 per cent. crawled out but died on the sides of the container whilst 40 per cent. crawled out of the carton and escaped. From the carton containing water, all the beetles crawled out and escaped. It may therefore be reasonably assumed that no *Necrobia* escaped after falling into or after immersion in kerosene and coconut oils or oleic acid but some may have escaped from the castor oil, so that in Experiment III more *Necrobia* may have entered the castor oil cartons. If the 40 per cent. were added to the number of *Necrobia* beetles recorded in the castor oil, the difference in the catches in oleic acid, coconut and castor oils would not be markedly dissimilar.

The Attraction of *Necrobia rufipes* de Geer. and of other Insects associated with Copra to various Oils and their Fatty Acids.

With the exception of myristic and lauric acids, the other fatty acids * of coconut oil seem to possess little attraction for *Necrobia,* and since it was thought that the mixed fatty acids, and not any particular fatty acid, of coconut oil might be the attractant the following experiment was conducted in a copra store where *Necrobia* and other beetles associated with copra were numerous. Cigarette tins with perforated lids containing the oils and fatty acids were hung from posts about five feet from the ground. The traps were placed in position on February 29th, 1932 and examined three times at an interval of one week. The result is tabulated on the next page.

During a period of three weeks, forty-two and forty-one *Necrobia* beetles were trapped in the tins containing the mixed fatty acids of coconut and palm kernel oil respectively. In the tin containing oleic acid, one of the fatty acids common to both coconut and palm kernel oils, only seven *Necrobia* beetles were recorded. This result suggests that there may be present in the mixed fatty acids an attractant other than oleic acid, if indeed that acid may be termed an attractant, and it indicates that the mixed fatty acids of coconut and palm kernel oils possess a greater attraction than their oils and the oils and mixed fatty acids of groundnut, rubber seed and olive. However, since fifteen were the most caught in a trap in one week in a store where *Necrobia* was abundant, neither the mixed fatty acids of coconut nor of palm kernel oil can be seriously considered as a control for *Necrobia.*

* Caproic acid was not included in any of the experiments.

Date of Examination	March 7, 1932			March 14, 1932			March 21, 1932			Total		
	Necrobia	*Silvanus advena*	*Carpophilus*	*Necrobia*	*Silvanus advena*	*Carpophilus*	*Necrobia*	*Silvanus advena*	*Carpophilus*	*Necrobia*	*Silvanus advena*	*Carpophilus*
(1) Coconut oil ...	2	14	0	2	29	2	0	14	0	4	57	2
(2) Mixed fatty acids of (1) ...	14	51	2	13	151	2	15	69	0	42	271	4
(3) Ground nut oil ...	3	66	2	5	126	3	8	111	4	16	303	9
(4) Mixed fatty acids of (3) ...	4	31	0	2	49	1	0	34	1	6	114	2
(5) Palm kernel oil ...	1	79	0	2	133	0	0	68	0	3	280	0
(6) Mixed fatty acids of (5) ...	15	54	3	13	27	3	13	47	0	41	128	6
(7) Rubber seed oil ...	4	48	2	7	116	2	3	29	1	14	193	5
(8) Mixed fatty acids of (7) ...	0	82	7	1	74	7	3	89	5	4	245	19
(9) Olive oil ...	3	49	3	1	62	0	0	24	0	4	135	3
(10) Mixed fatty acids of (9) ...	1	13	0	0	38	0	0	34	0	1	85	0
(11) Palm oil ...	0	18	0	0	26	1	0	18	1	0	62	2
(12) Oleic acid ...	4	18	0	2	27	0	1	36	1	7	81	1
	51	523	19	48	858	21	43	573	13	142	1954	53

In addition to the above information, the result shows that three hundred and three and two hundred and eighty beetles of *Silvanus advena* were recorded in the traps containing groundnut and palm kernel oils respectively. *Carpophilus dimidiatus*, which is most generally associated with wet mouldy copra, was not attracted in any significant degree to either of the oils or their fatty acids. Representatives of *Dermestes vulpinus* were recorded, the most (five) being caught in the trap containing the mixed fatty acids of palm kernel oil.

The Attraction of *Necrobia rufipes* de Geer. to Different Types of Copra.

In so far that oleic acid and the mixed fatty acids of coconut oil had not been proved to show pronounced attraction, and that degenerated mouldy copra appeared to possess greatest attraction, an experiment employing for comparative purposes oleic acid was conducted with different types of copra.

Mr. F. C. Cooke,* Officer-in-Charge, Copra Investigations, prepared and designated the various types of copra. The types of copra and the oleic acid were contained in open kerosene tins. These tins were placed about a yard apart on the top of sacks containing copra ready for shipment. *Necrobia* beetles were numerous in this store. At the time of inspection, all beetles within the tins containing the various types of copra were caught and those in the tin containing oleic acid were brushed into it. The oleic acid was filtered through gauze at each examination. The collections were recorded daily through a period of nine days and are given in the table on the next page and are also graphically represented.

Considerations of the Table and Graph.

Necrobia rufipes de Geer.

Necrobia rufipes undoubtedly prefers slimy, mouldy and wet copra to dry copra with or without surface moulds so that there would appear to be good grounds for supposing that decomposition products produced by fungi and bacteria attract this insect. The apparently greater attraction of hard, dried-up, slimy copra free from moulds over half-dry, slimy and mouldy copra may be due to decomposition having proceeded further in the former than in the latter.

In oleic acid twenty-seven *Necrobia* were collected, but in so far as in this number are included *Necrobia* beetles falling into the oleic acid during two hundred and sixteen hours, this number is probably greater than it should be. *Necrobia* in all other counts was only that number within the tin at the actual time of examination.

Grubs of *Carpophilus* were observed on the fifth day in the slimy and mouldy raw copra and on the seventh day in the half dried slimy and mouldy copra. *Necrobia,* being highly predacious on its own grubs as well as on the grubs of *Carpophilus,* was expected to increase in these two tins. The records, however, have not confirmed this and *Necrobia* would therefore appear to favour these types of copra for feeding and laying eggs and not for devouring grubs of *Carpophilus* and other insects.

Silvanus advena Walk.

Silvanus advena prefers soft, slimy and mouldy wet copra to hard, dry, slimy copra free from moulds, to dry copra with green mould, to half-dried, slimy and mouldy copra, to white, fresh, and dry copra and to old and dry estate copra, in descending order. The slight rise on the eighth day in the case of hard, dry, slimy copra and on the seventh day in that of fresh, dry copra is considered to be due to slight development of surface moulds, and the fall after the fourth day in the cases of half-dry, slimy and mouldy copra, of slimy, mouldy, raw copra and of dry copra with green mould to the removal of the mouldy growth by the insects.

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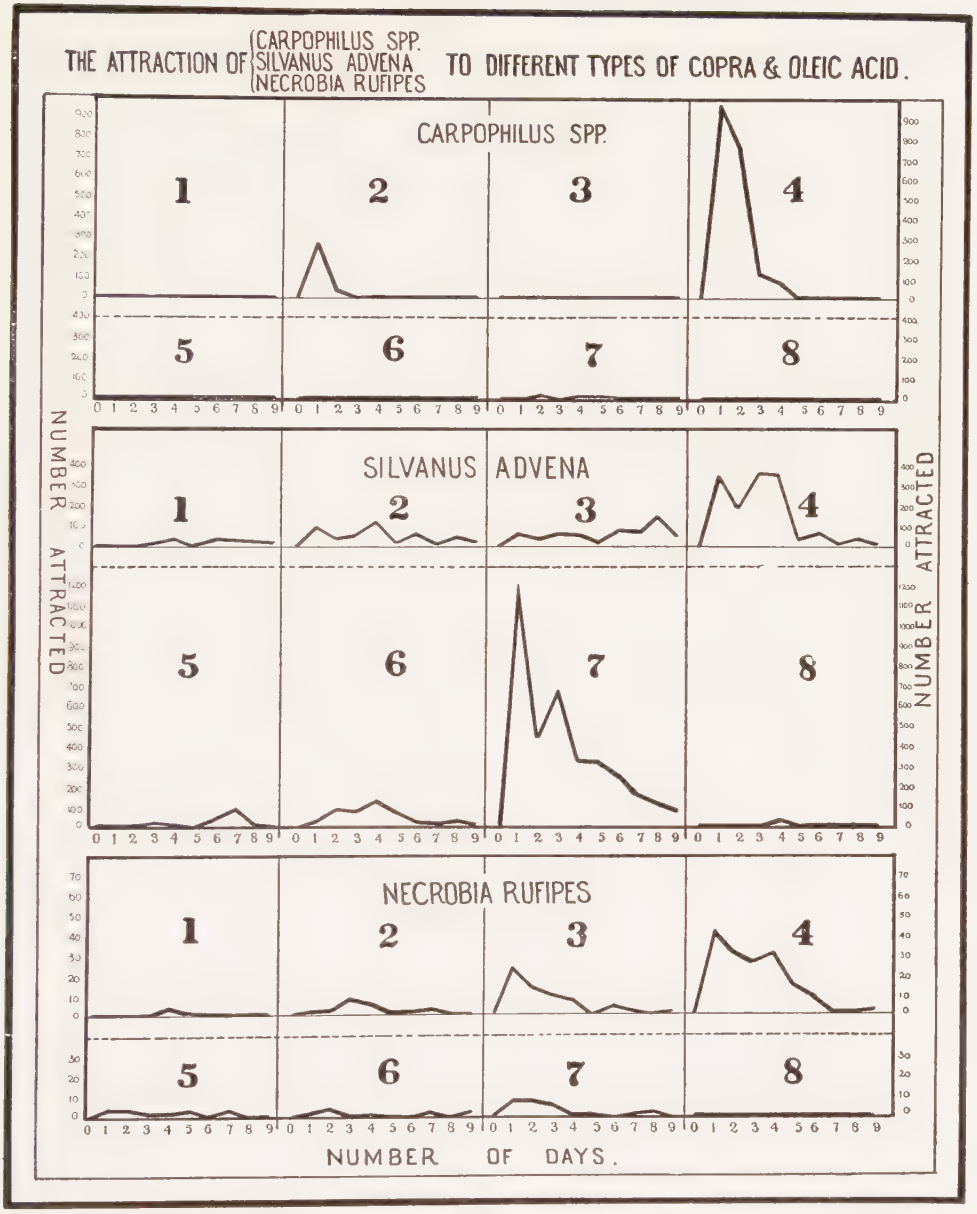
* The writers would like to record their great appreciation of the many helpful suggestions which they have received from Mr. F. C. Cooke and of the keen interest which he has displayed during the course of these experiments.


THE ATTRACTION OF (CARPOPHILUS SPP. SILVANUS ADVENA NECROBIA RUFIPES) TO DIFFERENT TYPES OF COPRA & OLEIC ACID.
CARPOPHILUS SPP.
SILVANUS ADVENA
NECROBIA RUFIPES
1 2 3 4 5 6 7 8
NUMBER ATTRACTED
NUMBER OF DAYS.
1 FMS.EST. COPRA OLD AND DRY
2 SLIMY & MOULDY COPRA HALF DRY
3 SLIMY COPRA DRIED
4 SLIMY & MOULDY WET COPRA
5 WHITE COPRA NEW & DRY
6 DRY COPRA WITH GREEN MOULD
7 OLEIC ACID
8 "COPRA" DUST

Record of Catches on	First day			Second day			Third day			Fourth day			Fifth day			Sixth day			Seventh day			Eight day			Ninth day			Total		
Types of Copra.*	*Necrobia*	*Silvanus advena*	*Carpophilus*	*Necrobia*	*Silvanus advena*	*Carpophilus*	*Necrobia*	*Silvanus advena*	*Carpophilus*	*Necrobia*	*Silvanus advena*	*Carpophilus*	*Necrobia*	*Silvanus advena*	*Carpophilus*	*Necrobia*	*Silvanus advena*	*Carpophilus*	*Necrobia*	*Silvanus advena*	*Carpophilus*	*Necrobia*	*Silvanus advena*	*Carpophilus*	*Necrobia*	*Silvanus advena*	*Carpophilus*	*Necrobia*	*Silvanus advena*	*Carpophilus*
1. Estate f.m.s. copra (old and dry) ...	0	3	0	0	3	0	0	17	0	4	37	1	2	6	0	1	32	0	0	31	0	0	25	0	0	21	0	7	175	1
2. Slimy and mouldy copra (half dry) ...	2	91	279	3	43	36	8	59	1	6	123	7	2	21	0	2	56	0	3	15	2	1	49	0	0	26	1	27	483	326
3. Hard copra with dried up slime (dry)	24	64	0	14	53	0	10	69	0	8	60	0	0	26	1	4	74	0	2	68	0	0	151	0	1	56	0	63	621	1
4. Slimy and mouldy copra (raw) ...	42	354	972	31	191	753	27	378	129	31	364	89	15	41	6	9	78	4	1	25	3	1	42	4	2	18	0	159	1491	1963
5. White copra, (fresh and dry) ...	4	7	0	4	9	0	2	28	1	2	18	0	3	9	0	1	48	0	3	96	0	0	12	0	0	8	0	19	235	1
6. Copra with green mould (dry) ...	2	32	2	4	91	1	1	84	0	1	138	0	0	84	0	0	30	1	2	28	0	0	33	0	2	13	0	12	533	4
7. Oleic acid ...	8	1217	5	8	447	13	6	681	0	1	334	11	1	325	13	0	264	8	1	167	8	2	119	9	0	87	0	27	3641	79
8 Copra dust ...	0	0	0	0	0	0	0	5	0	0	39	0	0	1	0	0	4	0	0	0	0	0	4	0	0	4	1	0	57	1
	82	1768	1258	64	837	803	54	1321	137	53	1113	108	23	513	20	17	586	13	12	430	13	4	435	13	5	233	8	314	7236	2373

* Classified by Mr. F. C. Cooke.

The number of *Silvanus advena* attracted to oleic acid is remarkable but its fall is not easily explained unless the excretions of insects rendered it less attractive. It may be suggested that, since oleic acid when fresh undoubtedly attracts large numbers of *Silvanus advena,* it should be employed as a control. The fact, however, that *Silvanus advena* is practically entirely mycetophagous (unpublished records), suggests that the employment of this or any control would be of doubtful benefit.

Carpophilus dimidiatus F.

The graphs and figures clearly show that *Carpophilus dimidiatus* prefers wet, actively slimy, and mouldy copra. To the dried copras, whether supporting mould or not, and to oleic acid, this beetle is definitely not attracted.

In addition to the beetles considered above, *Tribolium castaneum* Hbst., *Silvanus surinamensis* L. and *Dermestes vulpinus* F. were occasionally recorded, but neither type of copra nor oleic acid possessed any attraction. Previous work has shown that the presence in Malaya of the two first-mentioned insects in copra is largely due to the use of old rice sacks for the transport of copra.

The Attraction of *Necrobia rufipes* de Geer. to Slimy Wet Copra and to Dried but somewhat Soft Slimy, Copra.

It has been suggested that the apparently greater attraction of dried, slimy copra without moulds than that of half-dry, slimy and mouldy copra may be due to bacterial products being present in greater quantity in the former than in the latter. Accordingly, another experiment was conducted with fresh, wet, slimy copra, and dried, though somewhat soft, slimy copra. *Necrobia* at first was attracted to the fresh, wet, slimy copra, but after a short time left this copra and congregated on the dried, somewhat soft, slimy copra. It is possible that *Necrobia* was attracted to the fresh wet, slimy copra in greater numbers at first on account of the presence of moisture. This has been observed when *Necrobia* has been supplied with fresh coconut meat. In five observations as to the attraction of *Necrobia* to the above types of copra, 12 *Necrobia* were recorded on the wet, slimy copra but 81 *Necrobia* on the dried, somewhat soft, slimy copra. With the development of moulds, however, on the wet, slimy copra, *Necrobia* was again attracted in greater numbers. The wet slimy copra commenced to grow moulds almost immediately and at the observations at different times from the fourth to the eighth day, the number of *Necrobia* recorded on the slimy, wet copra was 172 and on the dry, soft, slimy copra, which commenced to show signs of mould on the eighth day was 176. This result again demonstrates that, with the development of moulds, *Necrobia* is attracted in larger numbers, and indicates that as the decomposition products produced in copra by bacteria and moulds increase, the number of *Necrobia* attracted thereto is enhanced.

Conclusion.

This investigation suggests that measures such as the use of traps and the regular fumigation of copra stocks at the port of export for the control of insects associated with copra would be unnecessary in Malaya, if good quality copra were produced.

Summary.

1 *Necrobia rufipes* de Geer. is attracted most to slimy, wet, mouldy copra and more to slimy, dry than to slimy, wet copra. ? It shows little attraction towards good dry copra. *Carpophilus dimidiatus* F. (mostly) and *Silvanus advena* Walk. are most attracted to slimy, mouldy copra.

2. *Necrobia* appears to be attracted more to lauric and myristic than to the other fatty acids of coconut oil and to the mixed fatty acids of than to the oils of coconut and palm kernel. *Silvanus advena* is attracted to oleic acid in large numbers but *Necrobia rufipes* is not sufficiently attracted to recommend the employment of the acid as a control for this beetle.

3. It is suggested that *Necrobia rufipes* de Geer. is attracted to the decomposition products in copra as a result of bacterial or fungoid activity.

4. Traps and fumigation are not recommended for the control of insects associated with copra. The production of good copra in Malaya is favoured.

CONDITIONS ON RUBBER SMALL HOLDINGS IN MALAYA.

1st Quarter, 1935.

Prepared by the Economic Branch of the Department of Agriculture, S.S. and F.M.S., in collaboration with the Field Branch of the Department.

Rainfall.

The first quarter was exceptionally dry, rainfall being below normal in January and February in nearly all parts of the Peninsula, March was a wetter month, but the majority of reports indicate that the rainfall was below average.

Prices.

The market for rubber weakened towards the end of the quarter and prices for small-holders' rubber accordingly fell in sympathy.

The usual tables are given covering several centres in each State. Table I shews the lowest and highest prices at which rubber was purchased and Table II gives the mean of the extremes.

Production.

Table III shews production on small holdings for the quarter under review, and also, for the purpose of comparison, the relative figures for the first quarter, 1934. It will be seen that there was a very considerable fall in production as compared with the previous year, due no doubt, to the operation of rubber regulation. The table is compiled from the monthly report of stocks, production, imports and exports of rubber, published by the Registrar-General of Statistics, Straits Settlements and Federated Malay States.

Tapping.

Tapping was considerably less during the quarter, as is shewn by the fall in production. A variety of reasons for this fact are advanced in reports; the wintering of trees, poorer prices, and lack of coupons were probably the principal reasons for less tapping, while the incidence of padi harvesting in certain districts was a contributory cause.

Areas out of Tapping.

Estimates of areas untapped on small holdings were obtained by counting the number of such areas and applying the percentage thus obtained to the total area of such holdings in the District.

Table I.

Lowest and Highest Rubber Prices Paid by Local Rubber Dealers.

(In Straits dollars per picul (133 1/3 lbs.))

1st Quarter 1935.

	Penang	Perak	Selangor	Negri Sembilan	Pahang	Malacca	Kedah	Johore
				JANUARY				
Smoked sheet	23.00-28.00	19.00-26.95	21.00-26.00	23.00-27.50	21.00-25.80	22.00-25.00	23.50-27.00	22.00-25.75
Unsmoked sheet	22.00-26.50	19.00-23.50	22.00-23.00	21.00-24.80	19.00-23.25	21.00-24.00	20.50-23.50	19.00-24.00
Scrap	11.50-16.20	10.00-15.00	12.00-15.00	12.00.16.50	10.00-11.00	13.00-16.00	13.00-15.50	1.00-16.00
				FEBRUARY				
Smoked sheet	23.50-26.50	21.50-26.60	23.00-27.00	23.00-26.30	20.00-25.75	21.00-25.00	23.00-26.40	21.00-25.75
Unsmoked sheet	22.50-25.00	19.00-24.00	21.00-25.00	20.00-24.50	18.00-23.60	20.00-24.00	20.00-24.00	19.40-27.70
Scrap	9.00-17.00	10.00-15.00	13.00-18.00	12.00-17.70	—	13.00-16.00	14.00-16.00	1.00-17.00
				MARCH				
Smoked sheet	19.00-27.00	17.00-25.40	19.80-24.80	20.00-25.20	17.00-24.50	19.00-25.00	22.00-27.70	18.50-25.00
Unsmoked sheet	17.00-25.00	15.50-23.50	16.00-24.00	16.00-25.00	17.00-24.20	18.00-22.00	19.00-24.50	16.00-24.00
Scrap	7.00-16.00	10.00-15.00	5.00-15.00	13.00-17.00	—	10.00-14.00	7.00-15.00	4.00-18.00

Table II.

Mean of Lowest and Highest Rubber Prices Paid by Local Dealers at a number of Centres in each State.

(In Straits dollars per picul (133 1/3 lbs.))

1st Quarter 1935.

	Penang	Perak	Selangor	Negri Sembilan	Pahang	Malacca	Kedah	Johore
				JANUARY				
Smoked sheet	24.16-26.83	23.33-24.85	23.50-25.08	23.90-26.60	22.08-24.75	22.33-24.66	23.00-25.66	23.09-24.61
Unsmoked sheet	22.87-25.30	20.65-22.30	22.00-22.87	21.37-24.01	20.00-22.69	21.00-22.66	21.66-23.00	20.84-22.81
Scrap	13.00-14.55	12.16-13.33	12.75-14 50	12.83-15.42	10.00-11.00	13.33-15.00	14.00-14.83	10.47-12.56
				FEBRUARY				
Smoked sheet	24.47-25.83	23.55-24.70	24.05-25.76	23.80-25.86	21.84-24.31	22.33-25.00	24.00-25.80	23.27-24.90
Unsmoked sheet	22.95-24.70	20.98-22.49	22.00-23.66	20.83-23.62	19.75-22.17	21.00-23.00	21.50-22.36	21.25-23.44
Scrap	12.50-15.12	11 66-13.83	14.00-15.55	13.25-16.30	—	13.33-15.33	14.33-15.00	10.17-12 63
				MARCH				
Smoked sheet	20.83-26.00	20.48-23.55	20.96-24.06	20.50-24.95	19.10-23.82	19.33-23.66	23.50-25.23	20.20-22.78
Unsmoked sheet	18.87-24.25	17.82-21.71	17.50-20.66	18.00-21.79	17.75-21.75	18.00-20.66	20.50-22,83	18.41-21.34
Scrap	11.75-14.12	12.00-15.00	9 50-13.00	13.50-16.12	—	11.33-13.00	11.66-13.33	11.97-14.28

Table IV shews the result of the survey in March, and a very big increase is evident in areas out of tapping. The area out of tapping on small holdings at the end of March 1935 was 17.5 per cent. as compared with 7.8 per cent. at the end of December 1934 (93,100 acres as compared with 41,000 acres). In the Straits Settlements the area out of tapping was 15.4 per cent. at the end of March as compared with 9.4 per cent. at the end of December (17,900 acres as compared with 11,600 acres).

For the Federated Malay States and Straits Settlements together, 17 per cent. of the total area of small holdings was out of tapping at the end of March 1935 as compared with 8 per cent. at the end of December 1934. The increase in areas out of tapping is even more considerable if comparison is made with the survey in March, 1934, when estimated figures were 34,950 acres and 9,900 acres in the Federated Malay States and Straits Settlements respectively.

Condition of Holdings.

The improved standard of upkeep of small holdings has been maintained, and efforts have been made to clean up holdings and to carry out the advice given by Malay Agricultural Assistants and Asiatic Rubber Instructors.

"Wintering" was in progress at the beginning of the year but was almost completed by the end of the quarter.

In Perak Central a certain amount of young rubber was brought into tapping in an endeavour to obtain a higher coupon allowance. The areas involved were not large. A small amount of replanting took place in the Dindings. In Johore North also, tapping of immature rubber was commenced; in some cases in the hope of obtaining more coupons, and in others rent falling due at the end of the quarter possibly being the explanation.

Diseases.

Mouldy rot was little in evidence during the first quarter, the dry weather being unfavourable to its development. From Pahang it was reported that an outbreak in Kuantan had been satisfactorily controlled.

From Perak Central, only infrequent cases of pink disease were reported.

Secondary leaf fall, *Oidium Heveae,* was general throughout the Peninsula, but all cases reported were of a slight nature.

An increasing number of trees in the Muar District of Johore were reported as being attacked by boring beetles. Bad tapping is the primary cause, wounds affording an easy entrance to the beetles.

In Rembau, Negri Sembilan, a few small-holders have resorted to treatment by trenching for root disease. This disease still remains in evidence in Perak Central but the small-holder there is slow to take action. Brown Bast was fairly common in most localities in Selangor, and advice regarding treatment was given by the Asiatic Rubber Instructors.

Table III.

Production of Rubber on Small Holdings.

(in tons)

	1st Quarter 1935	1st Quarter 1934	Total for year 1934
Federated Malay States ...	16,736	32,492	104,141
Unfederated Malay States ...	16,021	22,094	81,459
Straits Settlements ...	2,867	7,823	31,403
Total ...	35,624	62,409	217,003

Grades of Rubber.

Particulars are given of the percentages of sales of smoked and unsmoked sheet, and it will be seen that preference for one type or the other would appear to be largely dependent on the custom of the district, although the small-holder is now beginning to realise the advantage under rubber regulation of producing smoked sheet. Sales of scrap were, for the most part, negligible.

Kedah.—There was an increase in the percentage of smoked sheet sold in comparison with the last quarter of 1934, and the following are the average percentages for smoked and unsmoked sheet respectively. North Kedah: 87, 11; Central Kedah: 60, 37; South Kedah: 52, 41.

Johore.—The proportion of smoked and unsmoked rubber remained almost unchanged. Johore North, with the exception of Panchor, favoured smoked sheet, the percentages being Segamat 50, Tangkak 85, Muar 71, Batu Pahat 84. The percentage of unsmoked sheet at Panchor was 98.8, and in Central and South Johore the percentages of this grade were: Endau 97, Johore Bahru 45, (scrap 25), Kota Tinggi 60 (scrap 15), Pontian 80 (scrap 15).

Perak.—In Krian and Selama there was again no change in the proportion of grades purchased. The percentages were:—Krian: smoked 30, unsmoked 70; Selama: smoked 80, unsmoked 20.

A marked preference was shewn for unsmoked sheet in Perak North and South, the percentage rising to 85 and 73 respectively, as compared with 66 and 63 in the previous quarter.

In Perak Central the percentages for smoked and unsmoked sheet respectively were:—Kuala Kangsar: 66, 34; Lenggong: 18, 82; Lumut: 63, 37.

Table IV.

Estimated Acreage of Tappable Rubber which was out of Tapping on Holdings of less than 100 Acres, at the end of March, 1935.

PERAK				SELANGOR				NEGRI SEMBILAN				PAHANG			
District	Total Tappable area	Total area untapped	Percentage	District	Total Tappable area	Total area untapped	Percentage	District	Total Tappable area	Total area untapped	Percentage	District	Total Tappable area	Total area untapped	Percentage
Batang Padang	37,288	4,100	11	Klang	18,879	4,200	22	Seremban	19,241	11,900	62	Raub	7,361	400	6
Kinta	34,180	3,100	9	Kuala Langat	29,263	3,500	12	Tampin	17,947	4,700	26	Kuala Lipis	15,951	3,000	19
Kuala Kangsar	43,485	6,100	14	Ulu Langat	38,807	6,600	17	Kuala Pilah	17,470	3,700	21	Bentong	13,600	2,000	15
Upper Perak	13,774	1,700	12	Ulu Selangor	30,632	3,400	11	Jelebu	6,270	900	15	Other Districts†	31,223	4,600	15
Larut & Selama	51,497	2,600	5	Kuala Lumpur	21,174	3,200	15	Port Dickson	10,653	6,700	63				
Krian	9,751	4,500	46	Kuala Selangor†	9,379	1,400	15								
Lower Perak*	47,937	6,700	14												
Dindings	7,279	4,100	56												
	245,101	32,900	13		148,194	22,300	15		71,581	27,900	39		68,135	10,000	15

MALACCA				PENANG & P. WELLESLEY				SINGAPORE			
District	Total Tappable area	Total area untapped	Percentage	District	Total Tappable area	Total area untapped	Percentage	District	Total Tappable area	Total area untapped	Percentage
Central	17,687	5,300	30	North	3,241	400	12	Singapore	12,781	600	5
Alor Gajah	31,387	3,500	11	Central	7,067	1,800	26				
Jasin	24,971	4,700	19	South	8,149	nil	nil				
				Penang	11,114	1,600	14				
	74,045	13,500	18		29,571	3,800	13		12,781	600	5

The percentage of areas out of tapping in December, 1934, was as follows:—Perak 6, Selangor 8, the Negri Sembilan 7, Pahang 15, Malacca 9, Penang and Province Wellesley 16, Singapore 2.

*Estimated from percentage for Kuala Kangsar.

†Estimated from percentage for other Districts in the State.

Selangor.—In Selangor the production of unsmoked sheet is becoming less and less popular. In the Kuala Langat District, Malay-owned smoke-houses are to be found in practically every small-holding with the result that little or no unsmoked sheet is now produced in this District. Scrap has become almost unsalable.

In the Klang District the percentage of smoked sheet was 81.3, the balance being scrap.

Penang and Province Wellesley.—Sales were almost entirely of smoked sheet with a small percentage of scrap. In one or two districts of Province Wellesley sales of unsmoked sheet reached 50 per cent.

Malacca.—The respective percentages of purchases of smoked and unsmoked sheet were as follows:—Central: 69, 25; Alor Gajah: nil, 94; Jasin: 43, 57.

Negri Sembilan.—There was a marked preference for unsmoked sheet, only this grade being sold at five centres. An average of percentages for the State is: smoked 57, unsmoked 42.

Sale of Coupons.

As usual the sale of coupons without rubber is reported from all parts of the Peninsula and it explains probably to a large extent the big increase in the holdings out of tapping. In Negri Sembilan it is understood that coupons are being sold for $13 per picul allowance, and many Malay small-holders apparently prefer to sell their rights at this price rather than produce rubber for which they would receive approximately an additional $10 per picul.

The same procedure was being adopted by Chettiar owners in the Kuala Kangsar District, and it is to the benefit of other small-holders who are thus enabled to dispose of more rubber. In other parts of Perak Central it was reported that small-holders were disposing of their coupons without rubber at a price ranging from 12 cents to 15 cents per kati allowance of rubber, afterwards selling their rubber at the price ruling for uncouponed rubber. It is considered that the small-holder loses slightly on each transaction.

General.

Reports indicate that, generally, the economic position of the small-holder is sounder in spite of a fall in prices. Nevertheless, there has been a tendency for small-holders to attempt alternative crops; in Perak Central there have been considerable acreages of *blukar* and *lalang* grassland re-opened for tobacco cultivation, and in the Dindings and Sitiawan, areas of fruit and food crops for home consumption and for sale at fairs have been reported to have been opened up by persons owning rubber holdings.

Reports from Pahang also indicate that more interest is being shewn in other crops, especially padi cultivation, but that there is no tendency to abandon rubber for alternative cultivation.

From this State it is also reported that in one of the southern districts, dealers are grading rubber into six grades, with a difference of $1 per picul between each grade. The small-holder thus may lose up to $6 per picul for poor quality rubber.

From Johore it is reported that at Segamat there is a marked tendency among small-holders owning two or more holdings, to tap heavily only one such holding in order to produce sufficient rubber to meet their coupon allowance. Similarly in Perak South, the Chettiar owners were leaving untapped the smaller unprofitable holdings and devoting their attention to the better holdings.

A slight change in marketing methods was recorded in the Muar District, where Chinese dealers who previously paid cash for rubber bought now make the sellers wait until the rubber has been re-sold in town. The reasons for this change are, (*a*) the fluctuation in the town prices of rubber, and (*b*) the remote possibility of the Chinese dealer losing on the transaction. From Johore it is also pointed out that small-holders who leased their holdings before the introduction of rubber regulation are still in bad financial circumstances, and are gradually interesting themselves in padi planting.

Review.

The Diseases and Curing of Cacao.

H. R. Briton-Jones. 143 pages, bibliography and index, illustrated. Macmillan & Co. Ltd., London, 1934. Price 10 shillings.

This book forms an addition to the series of hand-books dealing with the diseases which affect the major tropical crops. The need for such a series was discussed at the Imperial Mycological Conference held in London in 1929, and following this, the author, Dr. H. R. Briton-Jones, Professor of Mycology and Bacteriology at the Imperial College of Tropical Agriculture, Trinidad, was asked to write the handbook on cacao diseases.

A chapter on the curing of cacao has been added with a view to collecting together under one cover the available information on the subject in order to assist agricultural officers and cacao planters to understand the main principles underlying the preparation of cacao.

Although concerned with a crop which is not cultivated in Malaya, the book contains much of local interest since the diseases dealt with are, in the majority of instances, caused by fungi which are responsible for diseases of rubber trees and other crops in Malaya. In fact, the accounts of many of the root and stem diseases of cacao mentioned in the book are based on descriptions, published in literature emanating from the eastern tropics, of the diseases as they occur on the rubber tree.

In addition to the root diseases recorded both on rubber and cacao, two forms of root disease not affecting rubber are described. One of these is caused by species of Rosellinia, a fungus recently recorded as the cause of root disease of Arabian coffee and of grape fruit grown at Cameron Highlands. The accounts of diseases caused by Rosellinia in the West Indies should be of special interest to planters engaged in the cultivation of these crops in Malaya.

In a section of Chapter 1, under the heading Root Disease Control, the question of sources of root infection of the planted crops is discussed. The author considers the whole question of these root diseases from the point of view that the fungi responsible for the diseases are present in the soil beforehand. He recommends the adoption of methods tending to eliminate factors which encourage the attack of these fungi on the host plant rather than efforts to eliminate sources of infection, or attempts to confine a fungus to a limited area by means of isolation trenches, however useful these may be in certain cases. In this connection the benefit of the construction of the drainage system before planting is urged as a measure of prevention, not only on account of the protection afforded by the drains, but also on account of the beneficial effect on the soil. The extension, when necessary, of a portion of a system of isolation trenches to function as drains is also advised. Here of course the drainage requirements of the area should be considered.

On grounds of expense the author considers that the removal of dead trees, and the following up and extraction of diseased roots, is a counsel of perfection which is quite impracticable under normal conditions. While this may be a correct view under certain conditions the matter is one which should surely be determined by local conditions and particular cases. Furthermore, the danger of spore infection, from fructifications formed on diseased trees, which the author considers negligible as far as root disease is concerned, should not be ignored, particularly in connection with spore infection of *aerial* portions of adjoining trees by wound parasites such as *Ustulina zonata* in the case of rubber trees, or infection of crops in adjoining areas subject to a stem disease such as stem-rot (*Fomes noxius*) in oil palms.

In the chapter on stem diseases several pages are devoted to "Diplodia die back". The author's comments on this "disease" and his remarks on spraying as a control measure—a subject again referred to in connection with pod diseases and "witches broom" disease—are welcome. Spraying with a fungicide is undoubtedly a very important control measure in the case of certain diseases of plants, but the application of such a method in tropical plant disease control is limited, and in a large number of cases the initiating cause of a disease is not always the fungus which grows in the tissues of the affected plant but some outside factor such as incorrect agricultural methods, unsuitable environment, or climatic disturbances. Throughout the book the author stresses the importance of combatting disease by attempting to bring about conditions which are within the range of tolerance of the host and outside that of the parasite, a point of view which is now receiving increased attention by present day workers in the field of plant pathology.

The book is well illustrated, but would be improved by the inclusion of coloured plates, especially in the section dealing with pod-diseases.

A. T.

Departmental.

ANNUAL PRIZE DISTRIBUTION AT THE SCHOOL OF AGRICULTURE, SERDANG.

The annual prize distribution at the School of Agriculture took place on 18th April, 1935. In addition to the staff and students there were present the Hon'ble The Director of Agriculture, S.S., and Adviser on Agriculture for the Malay States (Dr. H. A. Tempany, C.B.E.), and the following members of the School Advisory Committee—Lt. Colonel B. J. Eaton, O.B.E., the Hon'ble The Undang of Rembau, C.B.E., M.F.C., and Messrs. Stanton and Swaine.

The Vice-Principal of the School, Mr. G. E. Mann, extended a cordial welcome to Dr. Tempany and the members of the Committee. In reviewing the past year's work, Mr. Mann said :—

" The past year has been one of steady, all-round progress and of increased confidence in the School. The number of students in residence has risen from 53 to 70; and, of these 70, no fewer than 22 are *bona fide* private students. As in the past, tuition fees have been levied in respect of students admitted at the request of Governments other than those of the Straits Settlements and Federated Malay States, and the revenue derived from tuition fees alone in 1934 has risen to more than $5,000—an increase of $2,000 over the previous year.

"Forty-seven students are leaving the School today on the conclusion of their respective courses of training. Of these, practically all the Malays have secured employment. Nine of them are earmarked for employment by Government in Selangor, Johore, Brunei and Kelantan; from eight to eleven will enter the Federated Malay States agricultural services, while four are going to the Rubber Research Institute. All six Chinese who are leaving have found employment—three in Government Service in Penang, Johore and Sarawak respectively, and three in private capacities. Only in the case of Indian students has there been any shortage of demand. One of them is going to the Rubber Research Institute, and two have been engaged by estates; but this leaves some six or seven young men for whom we must hope for better prospects in the near future.

"We could have found employment on estates for several more Chinese, had they been available. The demand for Chinese has been more or less evident for some time, judging from the fact that the proportion of students of this nationality has increased considerably during the past two years and is still increasing.

"The Scholarship system is now well established in the School, the Straits Settlements and Federated Malay States between them offering some 18 scholarships each year. I should personally like see this system extended still further as I am convinced that it provides a sounder method of selecting Government and other employees than to engage young men first and train them afterwards.

"With regard to the training which has actually been given at the School during the past year, I have little to say beyond the fact that it has followed

what is laid down in the curriculum, and that practical work has received all possible prominence. I should, however, like to refer particularly to the question of practical training in poultry husbandry. We have been able to give quite a fair measure of instruction in this subject during the past year, considering the very limited number of birds which we have; and I am hopeful that this side of our work—in which the students take a very keen interest—may be expanded in the near future.

"The School has enjoyed several games fixtures during the year—football, hockey and cricket providing the major bases of rivalry; and, although we have not exactly shone, we have at least done creditably. In any case, the games have all been thoroughly enjoyable, and that is the main thing.

"The School platoon of Volunteers, under Mr. Dawson, has also had quite a good year in spite of the fact that it lost the two trophies which it had won the previous year. It is, however, a good thing for these trophies to circulate, for it makes one realise that they are not to be gained for the mere asking, and so encourages the determination to win them back.

"Special courses for Junior Agricultural Officers and for Penghulus have again been held at the School during vacations. The addition of these courses throws a certain amount of extra work on the staff, but I am glad to say that this work is always willingly performed in the determination that no one shall accuse the School of not working to capacity.

"I have pleasure in acknowledging the good services of my staff during the past year, and would in particular pay tribute to the efficiency of Mr. Craig, who acted for me during my absence on long leave. I would also thank those officers of the Co-operative Societies Department, Rubber Research Institute, and the other branches of the Department of Agriculture for the valuable assistance which they have given the School".

Mr. Mann then called upon Dr. Tempany to distribute the prizes, diplomas and certificates which had been awarded in respect of the various courses of training, at the conclusion of which Dr. Tempany said:

"Today is another milestone in the history of this School, and the occasion is marked not only by the prize distribution but also by our pleasure in having with us the members of the Advisory Committee. This is the first opportunity which they have had since the School began of meeting the whole of the students together. On this occasion, I cast my mind back to the day, four years ago, when the School was opened by Sir John Scott in the middle of a terrific thunder-storm. At that time, many people regarded the School as a doubtful experiment. I was asked, "What are you going to do with the students who pass out?", and the opinion was generally held—even if it was not openly expressed—that the only openings would lie in government service. You have heard today what Mr. Mann has said about the 47 students who are leaving. A number of them are admittedly entering government service, but a fair proportion of them have secured posts in private capacities, and the demand is this respect is increasing.

"It is with considerable satisfaction that I notice the attention now bestowed on the School by the Press. Malaya is conscious of the School's existence and has confidence in the value of the training which it offers. We realise, of course, that it is impossible for the School to create agriculturists, but we can and do turn out better men than those who have had no instruction in agriculture at all.

"Going back to the opening ceremony in 1931, I ventured then to wonder whether that ceremony could be regarded as marking the beginnings of a change in the public outlook on Malayan agriculture and an awakening to the fact that greater attention must be paid to diversified agriculture, particularly the increased production of food-crops. Be it coincidence or not, I think the answer today is in the affirmative in spite of the partial rehabilitation of rubber.

"So far as the School is concerned, success is no longer in doubt. It is filled almost to capacity, and it is even likely that there will have to be a waiting list this coming year. The School has passed through severe vicissitudes. There was a period of nearly a year when its fate hung trembling in the balance, when none of us knew whether it would fall a victim to that most deadly weapon—the blue pencil of the retrenchment enthusiast—before it had had a chance of proving its value. Happily it was spared, an act of clemency for which I am personally convinced that the country will in the long run be devoutly thankful. The School has grown not only in numbers but in its corporate life. We already see the beginnings of tradition, the foundation of permanent social activities, and the conviction that those who have passed through its courses of training are better and more efficient citizens and workers as a result.

"To those of you who have won prizes and have been awarded diplomas and certificates, I offer my congratulations. I would add that there rests on you a responsibility to see that the traditions of the School are worthily maintained. I want you to remember in after life that you are ex-students of Serdang. I say, "Be proud of Serdang, and Serdang will be proud of you".

"In bringing about the considerable measure of success that has been achieved, let us not forget the work of the staff. I know that I am at present styled Principal of the School. But, owing to the growth of the work of my Department as a whole, it is now impossible for me to exercise more than a general degree of supervision and guidance in the administration of the School. The real credit for much of the progress made is due to the Vice-Principal, Mr. Mann, now back again from leave, and to his staff. Mr. Dawson went on leave in February, and we hope that he is having as pleasant a holiday as it was well earned. We welcome to the staff Mr. Choo Kok Leong, the son of a very well known and distinguished member of the Chinese community. His appointment has relieved in a considerable degree the great pressure of overwork to which the staff has of late years had to submit. I should also like

to acknowledge the work of the Malay staff, particularly that of Che Mohamed Noor and the two junior lecturers—one of whom, Che Samsudin, will shortly be going to Malacca where he will be in charge of the new Farm School, which may be regarded as the first child of this School. I also associate myself with the tribute which Mr. Mann has paid to the work of Mr. Craig while the the former was on leave.

"To the students who are now leaving us, I offer my best wishes for a successful career. I ask them not to lose touch with us, and to remember that if we can help them after they have left we shall be only too glad to do so. To those who are remaining on, I say that I trust that the coming year's work will mark a further advance on its predecessors. On you devolves the duty of carrying on the traditions of the School and of letting the newcomers see by your example what those traditions are. I wish you all a happy holiday".

Mr. Stanton, in the course of a brief speech, referred to the question of employment of Indian students. He was confident that, as time went on, there would be an increasing demand for ex-students of the School, and he felt that the value of the School in this respect was at present not thoroughly realised by the planting community.

A vote of thanks to Dr. Tempany was proposed by the Hon'ble The Undang of Rembau. This was seconded by Colonel Eaton, who referred to the excellent work which had been done by the nine Asiatic Rubber Instructors who had been recruited from the School a year ago. He looked forward to recruiting five more this year. He advised the students who were leaving to remember that they should always be students: that they should always be observant and careful to record their observations, the value of which would become evident sooner or later.

FROM THE DISTRICTS.

Compiled by the Chief Field Officer from Monthly Reports submitted by Field Officers.

April, 1935.

The Weather.

The weather in April was on the whole normal for the north. On the western side of the Peninsula it was at first hot and dry, but later showery and cooler with an average rainfall. In Larut District of Perak, however, precipitation was well above average, while in Upper Perak and Kinta Districts, the Temerloh District of Pahang, the Jelebu District of Negri Sembilan and the centre and east coast of Johore it was deficient, as it was also in the Kuala Langat District of Selangor and in Singapore Island. On the east coast the dry hot season commenced as usual in April, but while the rainfall was unusually low in Kelantan, it was somewhat above average on the coast of Pahang.

Remarks on Crops.

Rubber. There is little change to record in the general situation, beyond the increase in the percentage of restriction and the issue of export coupons to small-holders for the second quarter of the year. This issue, combined with the recovery of the trees from wintering, tended to increase production in some localities, but in others preparation of the fields for padi planting had the opposite effect. In the Negri Sembilan high tapping became even more prevalent than in the past.

Further instances were recorded of improvement in the quality of the sheet produced on small holdings as a result of the work of the Asiatic Rubber Instructors. In Kelantan the communal use of rollers for the preparation of sheet and the substitution of acid for alum as a coagulant are still spreading, in accordance with the teaching of the Department of Agriculture. In consequence the production of wet and dirty, block rubber is decreasing. It is curious, however, that in this State, peasant proprietors, who will willingly pay $22 for a pair of rollers, can only with difficulty be persuaded to spend a few cents on a sieve and to abandon the usual substitute consisting of a handful of padi straw in a coconut shell.

The mild, but widespread, outbreak of leaf mildew, *Oidium Heveae*, ran its course, and attacked trees showed marked improvement by the end of the month.

Padi. The padi harvest was practically completed everywhere, except in Larut District of Perak and in the large new areas of Sungei Manik in Lower Perak and Panchang Bedina in Kuala Selangor District. In the former it was in progress during the month; in the latter it is expected to begin in May.

In Kedah the first rough estimate of the crop is between 88 and 99 million gantangs of padi. This is higher than was expected when allowance had been made for the extensive damage done in some areas by floods earlier in the season. It is only about 5 million gantangs below the record crop of the previous season, this satisfactory result being attributed to high yields in the unharmed Kota Star District.

In Province Wellesley South a good yield was obtained, so that the whole crop in the Province and Penang Island has been good. In Kelantan the wet padi harvest has been fairly good.

The work of the new season is in all stages of progress up to transplanting in the inland Districts of Selangor, most parts of Negri Sembilan, the Lipis, Temerloh and Pekan Districts of Pahang and parts of Johore. In the Muar District of the latter State, more attention is being given to this crop, in consequence of which some 1,300 gantangs of padi of suitable pedigree strains have been ordered from Malacca for distribution to planters whose supply of seed is deficient.

The first stage of the All-Malayan Padi Competition continued to meet with good support at five local competitions which took place during the month.

The new Government rice mill at Temerloh was again put into operation early in the month, after a stop of about two weeks for certain alterations. The demand for its products is increasing and supplies of padi are coming forward steadily.

Copra. The price of copra improved somewhat and showed less fluctuation than in March. Consequently, copra-making attracted increasing attention. Approved kilns completed or nearing completion include one in Province Wellesley, two in Kuala Selangor and one at Beserah in Kuantan District of Pahang, while an existing kiln in the Province is being extended.

The inter-District trade in nuts continued, as did the preparation and sale of home-made coconut oil at prices ranging from 14 to 18 cents per bottle. Crops of nuts were still below normal in some parts of the country, especially in Kelantan and southern Pahang and the Muar District of Johore.

Pineapples. In Johore fruit supplies remained inadequate for factory requirements and prices were high. One reconstructed factory commenced operations. In Singapore the main season began during the month and all factories were working. One factory completed the erection of accessory buildings, such as bath rooms, kitchen and room for meals, which make for better hygienic conditions. In Johore the registration of two factories was cancelled by the Registrar under the provisions of the Pineapple Industry Enactment.

Fruit. Local species of mango, known as mempelam, kwini and bachang were fruiting in Johore, Pahang and Province Wellesley; the first two were being exported from the Muar District to Singapore. Durians were also fruiting in eastern Pahang, while other fruits in season were pomeloes, jack fruit and

jambu. Exports of bananas from the Kluang and Batu Pahat Districts of Johore to Singapore were continued. From Negri Sembilan increased planting of bananas and pineapples was reported, but it was also reported that in the neighbourhood of Lenggeng several hundred acres of the two fruits had been abandoned owing to attacks of disease.

Tobacco. In Kedah, Province Wellesley, Malacca and Johore the general range of prices for first quality leaf was between $30 and $45 per picul. In Perak, however, the range remained between $50 and $80 per picul and in western Pahang between $50 and $60 per picul. Second and third quality leaf sold at prices varying from $15 to $40 per picul, the higher prices being obtained in Perak.

In Kedah an area of about 30 acres is reported to have been planted during the month, and additional planting is also reported in Penang Island and in Upper Perak District.

At Jerantut in Pahang some 20 acres have been planted by Chinese on land owned by Malays. The Chinese clear the land and plant permanent crops, such as coconuts and fruit trees, along with the tobacco. After two or three seasons of tobacco they hand back the land to the Malay owners, who have thus had it cleared and planted without expenditure of money or labour.

Tapioca. Indications of a decline in tapioca production are provided by the fact that two factories in Kedah had to shut down through lack of supplies of root and that another in Johore had to supplement its supplies with sago stems. A decline in supplies is to be expected, since the existing areas of rubber interplanted with tapioca are becoming mature and the further planting of rubber is prohibited, while the cultivation of tapioca as a sole crop is very limited in extent at present, even when allowance is made for its use in rotation with vegetables on several hundred acres of Chinese market gardens.

Agricultural Stations and Padi Test Plots.

At the new Telok Datoh Agricultural Station in Kuala Langat District the second digging of lalang was nearly completed and some old fruit trees were removed. At the Raub Agricultural Station the drainage system was completed and clearing, stumping and levelling were in progress.

The harvest was nearly finished at the Sungei Blat Padi Station in Kuantan District. In spite of somewhat adverse conditions during the season, Siam 29 yielded 430 gantangs and Nachin 66 gave 410 gantangs per acre. These satisfactory yields promise well for the future of the surrounding padi area when once it has been evenly and fully planted.

The establishment of new Padi Test Stations at Sala Kanan in Kedah, in Kuala Pilah District of Negri Sembilan, in Luit mukim of Pekan District, Pahang, and at Jementah and Mersing in Johore was commenced.

Preparation of the land and sowing of nurseries was begun at the Kajang and Kuang Test Plots in Selangor, Kendong Plot in Negri Sembilan and the Temerloh and Pekan Plots in Pahang. At the Jelebu Plot in Negri Sembilan transplanting was in progress.

At Bukit Merah Padi Test Station in Province Wellesley a trial is again being made with the cultivation of certain vegetables during the fallow season. The ridges were prepared and planted during the month.

In accordance with the arrangement made in Krian for encouraging the planting over extensive areas of two or three of the best selected strains, some 3,100 gantangs of seed were distributed locally. There has again been a heavy demand for seed of pure strains from the Pulau Gadong Station in Malacca and supplies, owing to a poor harvest, will unfortunately again be deficient.

Holiday Course for School Boys.

A short holiday course in agriculture for school boys at the High School, Bukit Mertajam, was held at the neighbouring Agricultural Station during the month and was attended by 30 boys, a few of whom bicycled 10 miles daily to attend. It proved most successful.

Rural Lecture Caravan.

The Caravan continued its tour in Larut and Matang Districts during the first half of the month and, after an interval of 9 days for the period of bright moonlight when films cannot be shown out-of-doors, concluded its tour on April 23rd and commenced a tour in Krian on April 25th. During the moonlight period the exhibits only were taken for day tours to outlying places inaccessible to the caravan. This innovation gave encouraging results and the whole tour was successful.

Lecture to School Teachers.

The State Agricultural Officer gave a short lecture on School Gardens to some 70 Malay School teachers from the State who were attending a teachers' conference in Kuala Lumpur on April 19th.

Agricultural Shows.

A successful Agricultural Show for Lower Perak District was held at Telok Anson on April 27th and 28th and a combined District Padi Competition and Agricultural Show was held at Muar in Johore on April 5th. At the latter, classes were provided for padi, fruit, vegetables, cereals and village industries. There were only 50 entries for the Padi Competition and exhibits were not of outstanding merit. Exhibits in the fruit and vegetable sections were on the whole poor, because the fruits were out of season and weather during the past month or two had been too dry for successful vegetable growing.

Poultry.

There was an outbreak of disease at Kuala Selama in Perak which resulted in the death of some 80 birds. This was investigated by an officer of the Veterinary Department. The outbreak at Tras terminated without further loss.

Interest in poultry keeping was well maintained. As a result of lectures and demonstrations in the Perak South Circle, given by the Malay Agricultural Assistants, some 12 improved houses were under construction during the month.

At Kuala Jempol in Negri Sembilan ten Malays have subscribed capital to start a jointly owned poultry farm. Preparation of the ground and erection of houses were in progress.

The flock maintained by the Head Teacher at Batu Yon School in Pahang progressed well.

LOWER PERAK AGRICULTURAL SHOW.

The Lower Perak branch of the Malayan Agri-Horticultural Association held an Agricultural Show at Teluk Anson on the 27th and 28th April, 1935.

H.H. the Sultan of Perak declared the Show open. Among those present were the Hon'ble the Raja Muda of Perak, C.M.G., The Hon'ble the British Resident, Perak, and the District Officer, Lower Perak.

The Show combined the District Padi Competition, for which entries were fewer than last year, although the quality shewed improvement.

Classes were provided for copra, smoked rubber, fruit, vegetables and poultry.

Special exhibits of an educational nature were staged by the Department of Agriculture, the Drainage and Irrigation Department, the Health Department and the Sultan Idris Training College.

DEPARTMENTAL NOTES.

Visits of the Adviser on Agriculture.

The Adviser on Agriculture visited the Panchang Bedina rice area in Kuala Selangor on April 10th in company with the Adviser on Drainage and Irrigation, the Senior Drainage and Irrigation Engineer and the State Agricultural Officer. He traversed the newly opened padi area and inspected the various operations in progress. On April 19th and 20th he inspected the Government Dairy Farm at Fraser's Hill.

On April 25th the Adviser inspected the Coconut Station at Klang; he subsequently visited Mr. Goh Hock Huat's pineapple factory at Klang, and afterwards made a short tour in the Klang and Ulu Selangor Districts, visiting the site for the new Agricultural Station at Morib and inspecting the Agricultural Station at Cheras.

Meeting of the Agricultural Advisory Committee.

A meeting of the Agricultural Advisory Committee was held at the Department of Agriculture, Kuala Lumpur, on 16th April, 1935. Many aspects of the more important agricultural industries were discussed and the progress of the scientific and field work of the Department in relation to these crops examined. An abstract of the minutes of the meeting will be included in the next number of this Journal.

Advisory Committee, School of Agriculture.

A meeting of the Advisory Committee of the School of Agriculture was held at the School on 18th April, 1935. Various routine matters were discussed and agreed upon and the Vice-Principal's Report for 1934 adopted.

Arrangements have been made whereby selected students from the School may be admitted to the Imperial College of Tropical Agriculture, Trinidad, for a further course of training.

An innovation in the training at the School is that, from the beginning of the next school year, a number of Malay and non-Tamil-speaking students will be given some training in colloquial Tamil through the medium of evening classes. The matter is purely experimental, and is primarily designed to remove the objection that Malays are unfit for employment on estates as they usually cannot speak Tamil.

The meeting was informed that 47 students out of 69 are leaving immediately, on the conclusion of their respective courses of training, and that 46 places have already been reserved for incoming students. It is anticipated that the proportion of Malays in residence will be about 50 per cent. and Chinese 40 per cent.

Leave.

Major C. D. V. Georgi, O.B.E., Acting Agricultural Chemist, returned from leave on 11th April, 1935.

Mr. J. W. Jolly, Agricultural Officer, returned from leave on 13th March, 1935.

Statistical.

MARKET PRICES.

April, 1935.

Rubber.—There were only slight fluctuations in the price of rubber during April, opening and closing prices in Singapore being 19 and 19⅛ cents per lb. respectively. The Singapore average for the month for No. 1. X. Rubber Smoked Sheet was 18.91 cents per lb. as compared with 19.49 cents per lb. in March. The average price in London for the month was 5.70 pence per lb. and in New York 11.47 cents gold per lb. as compared with 5.76 pence and 11.42 cents gold in March.

Prices paid for small-holders' rubber at three centres during the month are shewn in the following table.

Table I.

Weekly Prices Paid By Local Dealers for Small-Holders' Rubber, April, 1935.

(Dollars per Picul.)

Grades.	Kuala Pilah, Negri Sembilan.				Kuala Kangsar, Perak.				Batu Pahat, Johore.		
	4	11	18	25	3	10	17	24	10	17	24
Smoked sheet		21.73	22.57	22.66	22.65	20.66	22.29	22.04	20.49	20.37	21.70
Unsmoked sheet	20.96	20.40	21.37	21.13	17.20	18.26	19.84	20.00	16.67	18.00	
Scrap							14.00				

Transport by lorry Kuala Pilah to Seremban 15 cents per picul, to Malacca excluding duty, 25 cents per picul, by rail Seremban to Penang $1.24 per picul, Seremban to Singapore $8.00 per ton.

Transport from Batu Pahat to Singapore by lorry excluding duty, 90 cents per picul.

Transport from Kuala Kangsar to Prai by railway $6.20 per ton.

Transport from Kuala Kangsar to Singapore by railway $10.00 per ton (minimum consignment 5 tons).

At Kuala Pilah the standard deduction for moisture in unsmoked sheet is 5 per cent.

At Kuala Kangsar the standard deduction for moisture in unsmoked sheet is 10 per cent.

No purchases at Batu Pahat on the 3rd April 1935.

Palm Oil. There was a further fall in this market, but palm kernels improved slightly. The following table gives quotations for the Malayan commodities.

Table II.

Prices of Palm Oil and Palm Kernels.

Date 1935.	Palm Oil in Bulk, c i.f landed weight Liverpool/ Halifax.	Palm Kernels, c.i.f. landed weight London/ Continent
	per ton	per ton
April 5	£ 19. 10. 0	£ 8. 5. 0
,, 12	20. 10. 0	8. 10. 0
,, 19	20. 0. 0	8. 10. 0
,, 26	20. 0. 0	8. 15. 0

Copra.—There was an improvement in the Singapore market for copra during April and prices rose steadily in the second half of the month. The sun-dried grade opened at $4.45 per picul and closed at $4.85, the average for the month being $4.57 per picul as compared with $4.44 in March. The mixed quality remained consistently 25 cents per picul lower than the better grade, averaging $4.32 per picul. The March average was $4.19 per picul.

Copra cake was quoted throughout the month at $1.15 per picul; the March average price was $1.43 per picul.

Rice.—The average wholesale prices of rice per picul in Singapore during March were as follows:—Siam No. 2 (ordinary) $3.77, Rangoon No. 1 $3.43, Saigon No. 1 $3.55, as compared with $3.37, $3.16 and $3.32 in February. Corresponding prices in March 1934 were $2.82, $2.47 and $2.62.

The average retail market prices in cents per gantang of No. 2 Siam rice in March were:—Singapore 27, Penang 20, Malacca 24, as compared with 23, 20 and 22 respectively in February.

Padi.—The Government Rice Mill, Bagan Serai, paid $1.80 per picul for padi during April. Prices per gantang ranged from 4½ to 13 cents in different parts of the country.

Tea.—Arrangements have now been made to obtain London market prices by air mail, and accordingly this month average prices for both March and April are given.

Several consignments of Malayan tea were sold in London during the months under review. A consignment of Kedah tea was sold at 9¾d. per lb. in March and three consignments were sold at an average price of 9.83d. per lb. in April. Two consignments of Boh Plantations tea were sold in March at an average price of 10¾d. per lb. and one consignment in April averaged 11d. per lb.

Average London prices per lb. paid during March and April respectively for tea consignments from other countries were as follows:—Ceylon 1s. 3.81d. and 1s. 4.17d., Java 9.40d. and 9.66d.; Indian Northern 11.35d. and 11.39d.; Indian Southern 1s. 0.88d. and 1s. 1.92d.; Sumatra 8.43d. and 8.91d.

The following are the latest Colombo average prices available and are quoted from the *Weekly Tea Market Report*, 30th April, 1935, of the Colombo Brokers' Association; prices are in rupee cents per lb.: High Grown Teas 67 cents, Medium Grown Teas 59 cents, Low Grown Teas 54 cents.

Tuba Root. (*Derris*).—Supplies of good quality roots sold on a basis of rotenone content were scarce and the price in Singapore advanced in April, averaging $50 per picul as compared with $46 per picul in March. There were good sales of roots sold on a basis of ether extract, the average price for the month being $40 per picul, an increase of $2 per picul as compared with the previous month. Non-Malayan roots averaged $32 per picul, an increase of $2 per picul.

Coffee.—There was a further fall in prices of coffee in Singapore in April. Sourabaya coffee opened at $17 to $18 per picul, but fell away to $16 to $17 per picul at the close. Palembang coffee averaged $11.19 per picul as compared with $12.25 in March.

Local prices for coffee remained low in April, ranging from $22 to $28 per picul according to quality.

Arecanuts.—Prices continued to weaken during April, Singapore average prices per picul were:—Splits $4.12 to $5.55, Sliced $6.12 to $8.25, Red Whole $5.44 to $6.31, Kelantan $5.72, the price in each range depending upon quality.

The average prices per picul quoted by the Singapore Chamber of Commerce were:—Best $6.04, Medium $5.55, Mixed $5.07.

Gambier.—The price of Block in Singapore during April remained unchanged at $5 per picul as compared with an average of $5.05 per picul in March. No. 1 Cube improved, the price being $11 per picul throughout the month as compared with the previous month's average of $10.70.

Pineapples.—Prices in Singapore per case have now been fixed by the Packers' Combine as follows:—Cubes $3.25, Sliced Flat $3.15, Sliced Tall $3.35. The March average prices were:—$3.19, $3.08 and $3.23 respectively.

Fresh fruit prices per 100 were:—Singapore, $2.50 and $1.50 for large and small sizes respectively; Johore, 1st quality $1.80 to $2.20, 2nd quality $1.50 to $1.80, 3rd quality $1 to $1.20. Selangor, 70 cents to $1.50 according to quality.

Tapioca.—Prices per picul in Singapore for April remained unchanged at the March closing levels. They were : Flake Fair $4; Seed Pearl $5.40; Medium Pearl $6 as compared with $4, $5.42 and $6 in March.

Sago.—Pearl, Small Fair improved slightly in April to average $3.74 per picul as against $3.67 in March, while Flour, Sarawak Fair weakened to average $2.30 per picul as compared with $2.42 in March.

Mace.—Prices in Singapore were lower during April. Siouw averaged $98.75 and Amboina $58.50 per picul as compared with $105 and $61.20 respectively in March.

Nutmegs.—Prices in Singapore weakened slightly at the close of April, but the averages for the month were higher in comparison with March. They were : 110's $27.50 per picul; 80's $28.50 per picul as against $27.20 and $28.20 respectively in the previous month.

Pepper. The market for White continued almost a nominal one, but Black was in fair demand. Average April Singapore prices per picul were :— Singapore Black $13.75, Singapore White $26.50, Muntok White $27.50 as compared with $14, $32.40 and $33.40 respectively in the previous month.

Cloves.—Prices in Singapore remained nominal, but Amboina was further marked down to $36, averaging $37.50 per picul, as against $40.80 in March. Zanzibar was unchanged at $35 per picul.

Tobacco.—Local prices again varied considerably in different parts of the country. In Johore prices were from $15 to $50 per picul, Java tobacco being from $40 to $90 per picul. In Perak prices ranged from $18 to $82 per picul according to quality.

The above prices are based on London and Singapore daily quotations for rubber; on the Singapore Chamber of Commerce Weekly Reports for the month and on other local sources of information. Palm oil reports are kindly supplied by Messrs. Guthrie & Co. Ltd., Kuala Lumpur; the Singapore prices for coffee and arecanuts by the Lianqui Trading Company of Singapore, and tuba prices by Messrs. Mackay & Co., Singapore.

1 picul = 133⅓ lbs. The Dollar is fixed at two shillings and four pence.

Note.—The Department of Agriculture will be pleased to assist planters in finding a market for agricultural produce. Similar assistance is also offered by the Malayan Information Agency, 57, Charing Cross, London, S.W.1.

GENERAL RICE SUMMARY*

March, 1935.

Malaya.—Imports of foreign rice into Malaya in March were 55,905 tons, and exports 14,357 tons; net imports accordingly were 41,548 tons. Net imports for the first quarter of 1935 were 113,041 tons, an increase of 3.5 per cent. when compared with the previous year.†

Of the imports during March, 57 per cent. were consigned to Singapore, 20 per cent. to Penang, 5 per cent. to Malacca, 15 per cent. to the Federated Malay States and 3 per cent. to the Unfederated Malay States. Of the total, 57 per cent. came from Siam, 37 per cent. from Burma, 5 per cent. from French Indo-China and 1 per cent. from other countries.

Of the March exports, 72 per cent. were consigned to the Netherlands Indies and 28 per cent. to other countries. The various kinds of rice exported were as follows: Siam 9,828 tons, (68.5 per cent.), Burma 3,417 tons (23.8 per cent.), French Indo-China 521 tons (3.6 per cent.), parboiled 495 tons (3.4 per cent.), local production 96 tons (0.7 per cent).

India and Burma. Foreign exports in January and February totalled 296,000 tons, an increase of 48.7 per cent. as compared with 199,000 tons in 1934. Of these exports 3.4 per cent. were to the United Kingdom, 5.8 per cent. to the Continent, 26 per cent. to Ceylon, 39.5 per cent. to the Straits Settlements and the Far East, and 25.3 per cent. to other countries. The 1934 percentages were 12.1, 8, 36.2, 21.6, and 22.1 respectively.

Burma's total exports of rice and bran (*Bangkok Times,* 8th April, 1935) from 1st January to 2nd March 1935 totalled 705,750 metric tons, as compared with 528,728 metric tons in 1934, an increase of 33.5 per cent.

Siam.—No further information is available since the February Summary.

Japan.—According to the *Trans-Pacific Journal,* 21st March 1935, rice stocks in Japan proper on March 1, amounted to 6,519,920 tons, a decrease of about 14 per cent. as compared with 1934.

The supply and demand for the period 1st March to 31st October, 1935, are estimated as follows:—

Supply:	Rice stocks, 1 March	...	6,519,920 tons
	Imports	...	1,129,032 ,,
Demand:	Estimated consumption	...	6,099,579 ,,
	Estimated exports	...	42,076 ,,

shewing a surplus of 1,507,297 tons.

French Indo-China.—Entries of padi into Cholon during the period 1st January to 31st March, 1935, totalled 586,517 metric tons, an increase of 80.1 per cent. as compared with 1934; exports of rice were 580,351 metric tons, an increase of 70 per cent.

The Netherlands Indies.—No further information is available since the February Summary.

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* Abridged from the Rice Summary for March 1935, compiled by the Department of Statistics, Straits Settlements and Federated Malay States.

† It is to be understood throughout the summary that all comparisons and percentage increases or decreases are in relation to the corresponding period of 1934.

Ceylon.—Imports during the first quarter of 1935 were 133,715 tons, an increase of 9.2 per cent. as compared with 1934. Of this year's imports 10.5 per cent. were from British India, 73 per cent. from Burma, 1.3 per cent. from the Straits Settlements and 15.2 per cent. from other countries. The corresponding percentages for 1934 were 15.4, 67.7, 0.1, and 16.8 per cent.

Europe and America.—Shipments to Europe from the East for the period 1st January to 21st March, 1935, were 147,864 tons, a decrease of 13.2 per cent. as compared with 1934.

Of the 1935 shipments 37 per cent. were from Burma, 47.8 per cent. from Saigon, 13.1 per cent. from Siam and 2.1 per cent. from Bengal. The 1934 percentages were 25.3, 53.1, 16.3 and 5.3 respectively.

Shipments from the East to the Levant for the period 1st January to 2nd March 1935 were 12,312 tons, as compared with 5,327 tons in 1934.

Shipments to the West Indies and America for the same period in 1935 were 34,751 tons as compared with 11,852 tons in 1934.

Correction.

Malayan Production of Palm Oil and Kernels 1934.

Vol. XXII, August 1934, page 398.

Palm oil, Johore, should read: April 307.5,
May 444.0, June 543.0. Total 1,294.5 tons.
Palm kernels, F.M.S., should read: April 169.5.
May 154.1, June 116.6. Total 440.2 tons.

Vol. XXII, November 1934, page 577.

Palm kernels, Johore. Total should read: 254.8 tons.

Vol. XXIII, February 1935, page 104.

Palm oil, F.M.S. Total should read: 12,965 tons.

MALAYAN AGRICULTURAL EXPORTS, MARCH, 1935.

PRODUCT.	Net Export in Tons.				
	Year 1934.	Jan.-Mar. 1934.	Jan.-Mar. 1935.	March 1934.	March 1935.
Arecanuts ...	18,882	9,749	6,813	2,035	3,189
Coconuts, fresh † ...	100,826†	21,652†	22,825†	7,108†	8,080†
Coconut oil ...	25,485	6,251	7,271	2,384	2,706
Copra ...	95,618	27,499	30,366	10,445	7,276
Gambier, all kinds ...	2,170	559	672	231	250
Oil cakes ...	11,273	3,161	2,235	764	265
Palm kernels ...	3,196	497	825	151	460
Palm oil ...	15,852	2,244	4,423	580	1,247
Pineapples canned ...	66,633	14,289	14,874	5,457	5,250
Rubber ¶ ...	479,371¶	124,161¶	96,788¶	40,751¶	29,658¶
Sago,—flour ...	10,503	3,469	3,726	2,381	1,020
„ —pearl ...	6,177	766	1,110	291	321
„ —raw ...	7,079*	1,080*	1,723*	312*	583*
Tapioca,—flake ...	5,761	2,172	504	993	108
„ —flour ...	1,842*	532*	335*	319*	220*
„ —pearl ...	15,770	3,775	2,994	1,442	983
Tuba root ...	481	150½	133½	44	3*

† hundreds in number. * net imports. ¶ production.

MALAYAN PRODUCTION IN TONS OF PALM OIL AND KERNELS
1st Quarter, 1935.

(As declared by Estates)

Month.	Palm Oil		Palm Kernels	
	F.M.S.	U.M.S.	F.M.S.	U.M.S.
January 1935 ...	1,062.3	339.3	174.0	49.6
February „ ...	977.4	220.9	161.7	38.5
March „ ...	1,104.3	334.2	172.6	48.6
Total ...	3,144.0	894.4	508.3	136.7
January 1934 ...	926.0	166.3	152.9	30.8
February „ ...	849.7	129.9	131.6	27.3
March „ ...	1,046.1	220.6	183.0	42.7
Total ...	2,821.8	516.8	467.5	100.8
Total for year 1934 ...	12,965	4.510	2,013	795

MALAYA RUBBER STATISTICS

ACREAGES OF TAPPABLE RUBBER NOT TAPPED ON ESTATES OF 100 ACRES AND OVER, FOR THE MONTH ENDING 31ST MARCH, 1935.

STATE OR TERRITORY	Acreage of Tappable Rubber end 1933 (*d*)	ESTATES WHICH HAVE ENTIRELY CEASED TAPPING		ESTATES WHICH HAVE PARTLY CEASED TAPPING (*a*)		AREA OF TAPPABLE RUBBER NEVER BEEN TAPPED		Total (3) + (5)	Percentage of (9) to (2)
		Acreage	Percentage of (3) to (2)	Acreage	Percentage of (5) to (2)	Acreage	Percentage of (7) to (2)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
STRAITS SETTLEMENTS :—									
Province Wellesley	44,285	631	1.4	9,233	20.8	838	1.9	9,864	22.3
Malacca	121,152	356	0.3	17,599	14.5	3,407	2.8	17,955	14.8
Penang Island	1,366	194	14.2	236	17.3	145	10.6	430	31.5
Singapore Island	28,842	2,989	10.4	6,719	23.3	829	2.9	9,708	33.7
Total S.S. ...	195,645	4,170	2.1	33,787	17.3	5,219	2.7	37,957	19.4
FEDERATED MALAY STATES :—									
Perak	260,595	5,071	1.9	43,528	16.7	15,494	5.9	48,599	18.6
Selangor	310,003	8,748	2.8	47,547	15.3	14,561	4.7	56,295	18.2
Negri Sembilan	233,592	9,747	4.2	38,732	16.6	15,600	6.7	48,479	20.8
Pahang	46,712	4,715	10.1	17,649	37.8	10,904	23.3	22,364	47.9
Total F.M.S. ...	850,902	28,281	3.3	147,456	17.3	56,559	6.6	175,737	20.7
UNFEDERATED MALAY STATES :—									
Johore	365,400	10,220	2.8	28,353	7.8	18,709	5.1	38,573	10.6
Kedah (*b*)	126,588	1,798	1.4	28,886	22.8	19,591	15.5	30,684	24.2
Kelantan	25,793	5,962	23.1	933	3.6	5,962	23.1	6,895	26.7
Trengganu (*b*)	4,543	Nil	Nil	53	1.2	53	1.2	53	1.2
Perlis (*c*)	1,181	Nil	Nil	543	46.0	Nil	Nil	543	46.0
Brunei	(*d*) 4,991	Nil	Nil	1,496	30.0	874	17.5	1,496	30.0
Total U.M.S. ...	528,496	17,980	3.4	60,264	11.4	45,189	8.6	78,244	14.8
TOTAL MALAYA ...	1,575,043	50,431	3.2	241,507	15.3	106,967	6.8	291,938	18.5

Notes :—(*a*) Area out of tapping on Estates which have partly ceased tapping refers to areas definitely being rested and excludes areas on any tapping round.
(*b*) Registered Companies only.
(*c*) Rendered quarterly.
(*d*) Figures are as reported by estate managers.

MALAYA RUBBER STATISTICS — TABLE I

STOCKS, PRODUCTION, IMPORTS AND EXPORTS OF RUBBER, INCLUDING LATEX, CONCENTRATED LATEX AND REVERTEX, FOR THE MONTH OF MARCH, 1935 IN DRY TONS.

State or Territory 1	Stocks at beginning of month 1			Production by Estates of 100 acres and over		Production by Estates of less than 100 acres (estimated 2		Imports				Exports including re-exports				Stocks at end of month			Consumption 3	
								during the month		Jan. to March inclusive 1935		during the month		Jan. to March inclusive 1935						
	Ports	Dealer	Estates of 100 acres and over	during the month	January to March inclusive 1935	during the month	January to March inclusive 1935	Foreign	From Malay States & Labuan	Foreign	From Malay States & Labuan	Foreign	Local	Foreign	Local	Ports	Dealers	Estates of 100 acres and over	during the month	January to March inclusive 1935
MALAY STATES :—	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Federated Malay States ...	...	12,289	9,607	10,754	34,041	4,294	16,736	Nil	Nil	Nil	Nil	12,999	3,315	44,952	9,560		10,489	10,134	7	24
Johore ...	...	2,445	3,150	4,099	11,499	3,444	11,437	Nil	10	Nil	69	2,636	4,501	7,156	14,053	...	2,219	3,792	...	...
Kedah ...	...	254	1,868	2,407	7,669	674	2,805	Nil	Nil	Nil	Nil	1,384	1,447	4,712	5,158	...	237	2,135	...	...
Perlis ...	...	19	21	5	38	16	43	Nil	Nil	Nil	Nil	Nil	20	Nil	79	...	15	26	...	...
Kelantan ...	...	198	220	290	953	348	1,216	Nil	Nil	Nil	Nil	110	417	334	1,640	...	289	240	...	...
Trengganu ...	...	55	50	197	676	99	339	Nil	Nil	Nil	Nil	Nil	296	Nil	1,015	...	55	50	...	...
Brunei	...	19	32	35	141	51	181	Nil	Nil	Nil	Nil	Nil	102	Nil	313	...	6	29	...	...
Total Malay States	...	15,279	14,948	17,787	55,017	8,926	32,757	Nil	10	Nil	69	17,129	10,098	57,154	31,818	...	13,310	16,406	7	24
S. SETTLEMENTS :-																				
Malacca ...	...	3,208	1,150	1,315	4,049	558	1,853	Ni		Nil		2,448		9,272		...	2,849	1,395	...	...
Province Wellesley	...	1,802	472	443	1,443	231	595	Nil		Nil		7,295		20,859		...	1,240	506	...	...
Penang ...	2,372	13,126	16	15	46	90	155	2,225	10,133	6,998	33,321		Nil		Nil	2,447	12,162	11	...	...
Singapore ...	3,582	38,506	196	175	609	106	227	11,212		39,257		20,535		67,281		6,607	33,884	216	39	119
Labuan	...	37	Nil	Nil	Nil	12	37	174		708		Nil		Nil		...	36	Nil	...	...
Total Straits Settlements	5,954	56,679	1,835	1,948	6,147	997	2,867	13,611	10,133	46,963	33,321	30,278	Ni	97,363	Nil	9,054	50,171	2,128	39	119
TOTAL MALAYA	5,954	71,958	16,783	19,735	61,164	9,923	35,624	13,611	11,143	46,963	33,390	47,407	10,098	154,517	31,818	9,054	63,481	18,534	46	143

†Figures for the Dindings in columns 3 to 8 are included under F.M.S. with effect from 1st January, 1935.

TABLE II
DEALERS' STOCKS, IN DRY TONS 3

Class of Rubber	Federated Malay States	S'pore	Penang	Province We'sly D'dings M'cca.	Johore	Kedah
22	23	24	25	26	27	28
DRY RUBBER	9,636	31,298	10,709	3,962	1,589	155
WET RUBBER	853	2,586	1,453	169	630	82
TOTAL ...	10,489	33,884	12,162	4,131	2,219	237

TABLE III
FOREIGN EXPORTS

PORTS 29	For month 30	January to March 1935 31
Singapore ...	30,884	105,122
Penang ...	11,171	33,985
Port Swettenham.	5,080	14,451
Malacca ...	272	959
MALAYA ...	47,407	154,517

TABLE IV
DOMESTIC EXPORTS 4

AREA 32	For month 33	January to March 1934 34
Malay States ...	27,247	87,531
Straits Settlements	2,699	
MALAYA ...	29,946	87,531

Notes :—

1. Stocks on estates of less than 100 acres and stocks in transit on rail, road or local steamer are not ascertained.
2. The production of estates of less than 100 acres is estimated from the formula : Production + Imports + Stocks at beginning of month = Exports + Stocks at end of month. + Consumption, *i.e.*, Column [9] = Columns [15] + [16] + [19] + [20] + [21] + [22] − [4] − [5] − [6] − [7] − [11] − [12]. For the Straits Settlements the production of of estates of less thau 100 acres is represented by sales or exports as shown by cess paid.
3. Dealers' stocks in the Federated Malay States are reduced to dry weights by the following fixed ratios: unsmoked sheet, 15% wet sheet, 25% scrap, lump, etc., 40%; stocks elsewhere are in dry weights as reported by the dealers themselves.
4. Column (31) and (32) represent exports of rubber subject to regulation which, for Singapore and Penang Islands are represented by sales or exports as shown by cess paid.
5. The above, with certain omissions, is the Report published by the Registrar-General of Statistics, S.S. and F.M.S., at Singapore on 26 April, 1935.

METEOROLOGICAL SUMMARY, MALAYA, MARCH, 1935.

Locality.	Air Temperature in degrees Fahrenheit							Earth Temperature		Rainfall								Bright Sunshine.		
	Means of			Absolute Extremes						Total.		Most in a day.	Number of days.							
	A. Max.	B. Min.	Mean of A and B.	Highest Max.	Lowest Min.	Lowest Max.	Highest Min.	At 1 foot	At 4 feet			Amt.	Precipitation .01 in or more	Precipitation, .04 in or more	Thunder-storm	Fog morning obs.	Gale force 8 or more	Total.	Daily Mean.	Per cent.
	°F	°F	°F	°F	°F	°F	°F	°F	°F	in.	mm.	in.						Hrs.	Hrs.	
Railway Hill, Kuala Lumpur, Selangor ...	92.6	72.6	82.6	95	70	88	74	85.7	85.6	9.95	252.7	2.87	15	13	4	3		219.25	7.07	58
Bukit Jeram, Selangor ...	89.3	73.0	81.1	91	71	85	75	86.3	86.7	2.60	66.1	0.91	16	11				236.15	7.62	63
Sitiawan, Perak ...	89.8	73.8	81.8	92	72	87	75	84.8	85.2	4.83	122.7	0.77	19	16	3			225.55	7.28	61
Temerloh, Pahang ...	89.7	72.6	81.1	94	70	79	74	85.2	85.5	6.09	154.7	1.75	15	12	7	3		201.95	6.51	54
Kuala Lipis, Pahang ...	89.0	71.3	80.1	92	70	76	73	83.4	83.8	7.59	192.8	2.11	18	13	2	19		195.10	6.29	52
Kuala Pahang, Pahang ...	85.4	75.4	80.4	88	73	80	79	84.3	84.7	14.82	376.4	3.98	20	15				199.00	6.42	53
Kallang Aerodrome, S'pore ...	87.7	75.7	81.7	91	74	77	77	81.8	82.9	8.10	205.7	3.12	14	11	1			189.60	6.12	51
Butterworth, Province Wellesley ...	89.7	74.3	82.0	94	72	86	77	86.0	85.7	5.76	146.3	3.32	14	10			1	254.20	8.20	68
Bayan Lepas Aerodrome, Penang ...	89.4	74.3	81.9	93	71	86	80	85.7	86.5	4.25	108.0	1.63	12	8	4			251.55	8.11	68
Bukit China, Malacca ...	87.5	73.7	80.6	91	70	83	76	84.7	84.4	3.38	85.9	1.41	10	9	3			224.00	7.23	60
Kluang, Johore ...	89.6	71.6	80.6	94	69	80	73	82.3	82.1	7.14	181.4	1.62	19	18	9	10		191.85	6.19	51
Bukit Lalang, Mersing, Johore	85.0	72.9	78.9	88	70	79	77	81.5	80.5	5.95	151.1	2.03	19	15	1	1		203.75	6.57	54
Alor Star, Kedah ...	91.6	72.4	82.0	96	68	87	75	85.1	84.8	5.39	136.9	1.39	11	11	10		1	266.10	8.58	71
Kota Bahru, Kelantan ...	88.2	72.5	80.3	91	69	81	75	82.9	83.0	1.90	48.3	0.59	8	7		5		238.40	7.69	64
Kuala Trengganu, Trengganu	86.2	72.7	79.5	89	71	76	76	82.4	82.9	12.23	310.7	5.45	13	12		5	1	229.50	7.40	61
HILL STATIONS.																				
Fraser's Hill, Pahang 4268 ft.	74.0	62.3	68.1	78	60	67	64	72.9	72.6	10.66	270.8	1.79	20	17	2	10		175.35	5.66	47
Cameron Highlands, Tanah Rata, Pahang 4750 ft. ...	74.5	56.0	65.3	79	46	70	61	70.1	69.4	6.85	174.0	1.15	16	14	2			149.30	4.82	40
Cameron Highlands, Rhododendron Hill, Pahang 5120 ft. ...	73.5	59.5	66.5	78	57	68	62			6.87	174.5	1.39	17	14				156.35	5.04	42

Compiled from Returns supplied by the Meteorological Branch, Malaya